The Builder.

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"Going Along." *Vicenza: Palladio.*

THREE of our six weeks have passed since we flitted from London. Strasburg, Carlsruhe, Munich, Linz, the Danube, Vienna, Salzburg, Innsbruck, Botzen, and Venice have been stopped at, and, again "going along," we now find ourselves housed in the comfortable Hôtel de la Ville in the beautifully situated Vicenza. Everything has gone well: no time has been lost by misadventure or delay: with sunshine within and out, one fine sight or agreeable event has succeeded another, and the golden chain of travel is jewelled with pleasant memories. A little rhapsody under happy circumstances in such a clime, is more than permissible; the memory and the feelings are alike awakened, and History is made tangible. In the country that cradled the arts, and showed the world the way to freedom, herself not able to retain the blessing, the thoughtful sojourner feels strikingly at once the power of man and his weakness; and thus enthusiasm and melancholy are both evoked. This Vicenza was one of the four great cities of the Veronese marches (Padua, Treviso, and Verona being the others), that in 1163 formed the first league against the German Frederick Barbarossa, which afterwards became the League of Lombardy; Cremona, Brescia, Mantua, and other towns having joined. The story of the Italian republics is full of interest and suggestion, but this is scarcely the place to refer to it. Sismondi has written it well: go and read him. Suffice it here to say the League succeeded in a noble struggle against despotism and established a legal liberty. Then came discords and dissolution; corruption, and varied fortunes; conquest by the French, and ultimate committal to the tender care of Austria, from which the Lord deliver them!

In 1404 Vicenza yielded to Venice which had resolved to extend its frontiers to the Lake of Garda. A memorial of the Venetians' long occupancy of the city is found in the two columns put up by them in the Piazza dei Signori in imitation of those in the Piazzetta of St. Mark. A fresh lion has been recently mounted on one of these columns. The Piazza itself is a fine open place, with on one side a very lofty thin campanile, and in another part the celebrated Basilica, or Palazzo della Ragione.

Palladio, a son of Vicenza, was born in 1518, and lived till 1580. One of his earliest works, after long study and many measurements of the ruins of the ancient world, was the casing, so to speak, of this Basilica, the present aspect of which, with its two stories of arcades, is known to every architectural student. The design was chosen in competition with one by Giulio Romano (Giulio died in 1546), and has long commanded admiration. It is but a facing; the old Gothic building around which Palladio's arcades stand, still asserts itself, and the necessity for making the points of support in the new work, the piers and columns, agree with those of the old building, was one of the difficulties of the problem submitted to him. The openings, by the way, are over wide for their height, and look weak; the mouldings are admirable. Palladio took more pains in planning the edifices he erected than had been done before his time, and while re-using the old forms, met the wants of modern society. As Quatremere de Quincy correctly says, none of his predecessors in the imitation of the antique hit so happily as he did the *juste milieu* of "correctness without pedantry, severity without rudeness, and liberty without licence." He popularised ancient architecture, so to speak, and created a style which was at once seized on as meeting the views and the wants of the time. We must put ourselves back to his date to appreciate properly his talent. His buildings have been vulgarised by their adoption and repetition all over Europe, and they have led to a great deal of horribly bad architecture. This, however, must not make us unjust to the master. He was an artist of unquestionable ability.

One of the most interesting works left in Vicenza by Palladio is the Olympic Theatre, and this we have taken some pains to illustrate. For the Olympian Academy of Vicenza Palladio had built several temporary theatres in different places for the representation of the ancient drama. At last they determined on erecting a permanent theatre, and Palladio being, of course, commissioned to design it, took the ancient arrangement for his model, with its ranges of seats, one above another, for the audience, and its built-up "scene" with three entrances.* The view of the "scene," with the built-up streets in perspective to give the effect of distance, the plan, and the view of the auditorium, will convey some idea of this curious structure. The depth of the stage from the line of the orchestra to the end of the central street, is about 72 feet, corresponding with the width of the proscenium; a length of about 42 feet of this is on the slant, rising up towards the back. The perspective streets are very cleverly contrived: to light them up for a representation 5,000 little lamps are used. The last time this occurred was in 1857, when the "Orestes" was given. We may add to these statistics that there are ninety-five statues in the interior, thirty-two of them being of stone. The cost is said, on the spot, to have been 80,000 scudi, or 17,000*l*. In 1816 the theatre was restored at the cost of a patriotic citizen, and it is now in a fair state, with the exception of the ceiling, which is about to be renewed. Leaving the "scene" unfinished when he died, some writers affirm that Scamozzi was applied to and finished the theatre, Palladio's son Sylla, who succeeded his father in other works, not having the special knowledge requisite for the undertaking. This, however, is doubtful. Certain it is that the theatre was not finished till four years after Palladio's death: and a tablet over the central arch of the scene bears this inscription:—

VIRTUTI . AC . GENIO .
OLYMPICOR . ACADEMIA . THEATRVM . HOC
A . FUNDAMENTIS . EREXIT
ANN. M.D. LXXXIIII. PALLADIO . ARCHIT.

The numerous palaces erected in Vicenza from the designs of Palladio are mostly in a very bad state of repair. One, the Chiericati Palace, not his best, though some have called it so, has been thoroughly repaired and restored by the town, and is used as the public museum and picture gallery. This building has two orders of columns, one over the other, and in the wings these stand free at some distance from the walls of the building, forming thus a gallery both above and below. In the centre, however, the wall of the building on the upper story is brought out to the line of the columns, and has in it two stories of windows. The effect is very unsatisfactory, as might be imagined. On the staircase are medallion heads of Palladio, Scamozzi, and Calderari, a third architect of note belonging to Vicenza. In one of the apartments there is a collection of original sketches by them, including Palladio's design for the Rialto Bridge in Venice; autograph particulars by him of some of his buildings, filling a dozen large books; and Scamozzi's sketch-book, containing small careful drawings made in France. Many of these memorials were given to the town in 1839, by Gaetano Pinali, a Veronese. The collection of pictures, also chiefly gifts, includes a few good works by the great men of the Venetian school. There is also a very interesting picture by the earliest Venetian painter whose date is obtainable, Maestro Paolo, of Venice. Little else, however, seems to be known about him. Mr. Wornum says only "that an old parchment, illuminated by him bears the date of 1346." The picture to which we refer is an Assumption of the Virgin, dated 1333 (Murray has it 1323), and thus signed,—*Paulus d. Venetiis pixit hc opus.* The soul of the Virgin ascends in likeness of a new-born child, as was not uncommon in the earliest pictures on this theme. Christ, in a vesica, receives it. While, above, Christ in glory, with cruciform nimbus, still holds the swathed *bambino*. The head of the Virgin is admirable; and the sorrow of the angels around beautifully rendered. It is in several respects a remarkable work.

Not far from the basilica a marble statue of Palladio, by Vincenzo Gajassi was erected in 1859. He is represented standing, with part of an ancient capital behind his right foot. The head is good, but the limbs are clumsy. This memorial was presented to his country by Francesco Bressan, and is inscribed simply,—*Andrea Palladio, Architetto.*

Palladio's own house, in the Corso close by, must have had a better effect when the solid portion in the centre of the composition was adorned with a picture, as was probably the case. The front is now anything but pleasing. Vastly superior is the *Casa Pigafetta*, a charming little front whose designer is not recorded. It is dated 1481, and is in style partly Venetian. The balconies and brackets are elaborately sculptured. Under the windows of the ground floor, with carved groups of roses, is this legend:—

IL NEST ROSE SANS ESPINE.

An inscription in French in this neighbourhood is not common. We have given it literally. Of the palaces in the Venetian style, of which a few remain, that of the Conte Schio is the best example. In Vicenza the men of the sixteenth century wiped out much of what had been done before, so that of the Mediæval work comparatively little remains. The Duomo, a fifteenth century building, has a nave of great width, perhaps 60 feet. The choir, of later date, is ascended to by twenty steps, with a landing midway, and nine more steps to the high altar. Externally the east end, constructed of Verona marble, is lofty and good. At times, by the way, the intimation that a building is "of marble" conveys a wrong notion to the English mind; the material being often, when that is the case, rough, stained, and indistinguishable.

In the church of La Santa Corona, also Pointed in style, there is an exquisite picture, by Gian Bellini, of the Baptism of the Saviour by John, with a sculptured altar-piece around it. There are also some admirable Gothic tombs here. The high altar is a remarkable piece of mosaic work, and amongst the remembrances we bring away from the building is that of the head of a monk, carved in wood and coloured, which is fixed up over the door of the sacristy. In this church, we may add, Palladio was buried in 1580, when he died; but his body has been removed, in our own time, to the public cemetery formed outside the city at the northern end, where a costly monument is erected to his honour.

* See pp. 880, 881.

Palladio, in fact, is the crowning memory in the minds of the modern Vicentians.

It is a long, long day's journey by rail from Vicenza to Milan, and needs books, maps, pleasant companions, and a naturally sweet temper, to prevent it from being tiresome. When time does not press, a break at Brescia, with its two cathedrals, churches, and fine pictures, may be wisely made.

On the road, just past Verona, the Lago di Garda comes into view, and at the Desenzano Station, close to Peschiera,—Peschiera being the frontier town between Austrian Italy and Italy proper,—the train stops long enough for travellers to feast hastily on the magnificent view that presents itself. It is in truth a scene of surpassing beauty. The lake of Garda, which bounds three countries, Italy, Tyrol, and Austria, is the most extensive of the Italian lakes. Trees and villages cover the sides; the Island of Sermione and its ruined castle come into the picture. Precipitous hills close it in higher up, with the glorious Tyrolese Alps for back-ground; and on the hot, bright day to which we specially refer, the water was intensely blue, with flashes here and there of vivid green and violet. Nature that morning had spread her palette with the most brilliant colours; and had disposed the senses for keen enjoyment. It was not astonishing to hear an English voice exclaim, hard by, with honest enthusiasm (enthusiasm which had burst out before in a salute to the flag of Italy, then first seen flying), "Oh! Milly, Milly, do look at the water, the mountains, and the sky!" Not soon will that sight of the Lago di Garda be forgotten; though it was but a flash, gone before it was fully seen. Some views, like some words, open the mind to a clearer perception than it had before; and this was one of them.

THE FINANCIAL QUESTION OF THE WORKS IN PARIS.

The *Mémoire* or report presented by the Prefect of the Seine to the Municipal Council of Paris in its ordinary session of 1863, has been published during the week, in the *Moniteur*, and occupies fifteen columns of that official journal. It comprises the account of receipts and expenses for 1862, an estimate of the situation for the year not yet expired, and the scheme of the budget for 1864. Like the reports of previous years, it supplies facts, and draws conclusions from them, in contravention of the exactitude of the imputation against the management of the street improvements and other works, of reducing the number of residences of the smaller class in Paris, and effecting the production of residences of an expensive class alone. To the facts referred to, we could ourselves add others, to show the importance of more careful attention to the general subject than has been given, on this side the Channel, by many who have prognosticated ruin in the finances of Paris, as well as France, from the expenses comprised under public works; and who reason that it is impossible, whatever the objects, for improvements of similar magnitude to be made in London. We do not say that the financial position is clear to us: we merely assert there are facts, known to us as such, which would substantiate assertions of the *Mémoire*, and arguments which our knowledge of the results of neglect in London, might allow us to advance with greater force than that brought to bear by the Prefect of the Seine.

We have made many attempts to show that the improvements in the French capital, include much more than the adornment of the city in street-architecture, and the erection of richly decorated buildings. In the *planning* of through-*routes*, or lines for rapid communication between different quarters of the town, and between the several railway-stations; in the ample provision of public squares and gardens in the heart of Paris, besides that of parks at the outskirts; in the system of sewerage, now nearly completed; and in the arrangements for an abundant water-supply, in active progress, we see the probability of a contrast in the next eight or ten years, as much to our disadvantage in sanitary matters, as it will be in those, the decorative and architectural, which otherwise conduce to the comfort and even health of a population. The principle of planning buildings in *appartements*,—separate residences reached from a common staircase, but each tenement as complete as a house,—that is, planning them from the first, for the manner of their occupation,—we have also shown, is more favourable to domestic comfort and to morality, than the London system, so persisted in, of planning the building for a single family in cases where it is most unlikely to be so occupied; and we have seen a recognition of the views we have expressed, in the somewhat quickened progress in the erection of model dwellings. Also, we some time since showed, that the statements as to the existing deficiencies of Paris, even in the matter of water-supply, contrasted with London, and tested by the rates of mortality, of which we first published a comparison, were by no means borne out; and we could now find in the revelations of the state of Bethnal-green, evidence additional to the point that our metropolis is not in the comparatively fortunate position supposed, and that the neglect and tardiness for which financial grounds have been adduced, are not wise economy on the part of the nation.

We say the nation, because the opinion of a majority in the House of Commons seems to have pronounced against the allotment of national funds to the improvement of the nation's metropolis. It is greatly to be doubted whether the resources of London even, freed from the embargo of protesting vestries, would suffice for the works needed; at least the Metropolitan Board of Works in publishing a list of objects, some time since sought to explain that such was the position.

The Paris improvements are provided for mainly, by resources which do not exist in the case of London, aided however by a contribution from the State. These resources are the *octroi* duties, and money borrowed. It is in reference to the repayment of this money, or the future incidence of the charges for the payment of interest for it, that the unquiet feeling, if any, prevails. Where the principle of contributing by the State is recognized, the State might make up the loss; but every important town in France, and every part of the country and its shores, seems to be engaged on works draining the national exchequer. These however, all, might be met by a change from the policy of the Emperor as exhibited in affairs requiring large military and naval expenditure. If however, funds are capable of being provided through economy, we may question whether that engine of productiveness is not capable of being applied by the Government and Parliament of this country. In a recent number of the *Journal de la Société de Statistique de Paris*, we find prefixed to some forcible arguments on the cost of the "armed peace" of Europe, by Mons. Legoyt, a tabular statement by him, of the army, population, and military expenditure, of each of several countries, with the proportions of military to general expenses, of expenses per soldier, and other particulars. France having a population of 37,500,000, and a total expenditure of 688,645,395 francs, has an effective army of 513,349 men. The United Kingdom, with a population of 29,193,319, contrives to disburse, (unless this careful statistician be less reliable than usual) 677,429,375 francs, having an army of only 300,823 men. Reasons for the great expenditure of this country, which would be suggested to us, we are not here forgetting. The calculation of Mons. Legoyt results in tabulating the French expenditure per soldier as 1,341 francs, and the English as 2,231 francs; and the French military expenses as 33 per cent. of the total expenses, whilst ours as 39 per cent. The French appear from the same authority to have 1 soldier to every 73 inhabitants, whilst we have 1 to 97. It is obvious from such figures, that a reduction of armaments would get rid of any financial difficulty about public works, in either country.

The present question however relates to the sufficiency of such calculations as those of the Prefect of the Seine, on the basis of existing things and probabilities; and here we can only direct the attention of readers to the importance of considerations which we have alluded to, and not now attempt further investigation. Those who are on the spot do not seem to be in a better position than we are. We have endeavoured to inform ourselves of every argument that has been adduced in France, for the last two or three years, against the municipality; but have found the arguments, one after another, contradicted by facts adduced in reports such as the one now under notice. Even supposing it be admitted that the great increase of *logements*, or residences, has been provided in the former suburbs, now annexed to Paris, it must be recollected that the distance from these localities to the centre, is not great, as it is in London, and that much has been done to provide them with direct connecting *routes* to the heart of the city. Omnibuses are numerous; and an outside seat costs three *sous*.

The *Mémoire* of the Prefect shows that the total receipts of 1862 were 175,712,567 *francs* 90 *centimes* (about 7,028,503*l*.). The expenses were 165,888,899 *francs* 49 *centimes* (6,635,556*l*.). Thus there was a balance left in hand of 9,823,668 *francs* 41 *centimes*. Was this balance made up of money that had been borrowed? It is estimated that the balance in hand this year will be 12,685,743 *francs* 27 *centimes*. The budget for 1864, figures the receipts as 151,408,942 *francs* 7 *centimes*, and the expenses as the same in amount. Each of these is composed of several kinds of items thus:—

	Receipts. francs. c.		Expenses. francs. c.
Ordinary	123,945,812·07	....	81,881,975·90
Extraordinary	10,625,500·00	....	52,689,336·17
Supplementary	15,500,500·00	....	15,500,000·00
Special	1,337,630·00	....	1,337,630·00
Total	151,408,942·07	....	151,408,942·07

Mr. A. Darimon, in noticing this report, in *La Presse*, says that the method followed by Monsieur Haussman, has the advantage of offering under each head, information which is of great value in more respects than one, but that it has the inconvenience of impeding a comprehensive view of the finances of the city. From the infinity of details which are presented, there is a resulting obscurity from which the reader does not readily disengage himself. He says that attentively to read the exposition of the finances of Paris is a labour which is almost repulsive; what is it then, he asks, to understand them? He thinks it would cost nothing, to give more clearness to the statement, and that this is especially necessary in a city which has not an *elected* municipal council. We apprehend the same form would express the opinion of many others. The accounts are not understood; they may, or may not, be wrong; only, those who have thought them wrong have made mistakes in some of their statements.

Mons. Haussmann dwells upon the circumstance of the annexation of the suburban communes having troubled the finances temporarily, through expenditure required in excess of the receipts. A main point advanced to show that the small tenements have not been suppressed, is that of an increase in the number of total or partial exonerations from certain taxes. These exonerations are graduated from 250 *francs* (10*l*.) to 1,500 *francs* (60*l*.), of *imposable* rent, or 312 *francs* 50 *centimes* to 1,875 *francs* of real rent; and there will be 4,011 total, and 639 partial, exonerations more in 1864 than in 1863.

Great exertions are being made in France, to improve and extend primary education, or to get the Government to take steps to that effect. Of these exertions we may one day speak. But the city of Paris appears to recognize its obligations. The elementary instruction, with the maintenance of buildings, will cost Paris 4,223,007 *francs* (over 168,920*l*.) in 1864. At present, the number of schools belonging to the city is 448 (providing for 88,704 scholars), besides 17 free schools. Forty-six new scholastic establishments are about being opened. They include two special schools of design for women.

Surely, the Prefect of the Seine and the Emperor need but to tell the whole truth, without mystification, and rely upon the spirit of France,—in this sense indeed, "rich enough to pay for her *glory*." Let London, and this country, seek to learn even in sanitary matters, from what the French are doing. There is money-value in the results.

WHAT WE FIND IN THE SMITHFIELD CLUB SHOW.

In the olden time men scarcely understood that easy means of communication are to a land what the circulation of the blood is to the individual. Inter-exchange, whether of goods or of thought, were then always difficult and expensive, and sometimes impossible. The intermittent activity of the great meetings, of which the country fair is a feeble remaining vestige, are now superseded by the continuous and healthy flow of modern intercourse. While the Mediæval "fair," properly so called, is thus obsolete, at any rate in England, the many local and peripatetic shows fostered by our agricultural societies are blooming with a perennial vigour. The reason is obvious: agriculture is in a state of transition. The great modern revolutionist, steam, is making its impress on the land. All great changes must be gradual to be enduring; and the agriculturist comes to these shows, sometimes with the intention of buying, but always with that of learning. We

can only get at truth by comparison; at commercial goodness by competition; and to the emulation brought into play by these shows are partly due the late rapid strides of agricultural engineering. Whether the accounts given by the attendants at the different stands are not to be taken *cum grano salis*; whether, in fact, the love of veracity of agricultural engineers has been as much improved by these shows as their engines, are questions we leave to be decided by the moral philosopher.

The arts of peace are all more or less allied; while the demands of agriculture upon mechanical ingenuity have been so many and so varied, that more than one operation in the building trade has been facilitated by mechanical arrangements originally intended for agriculture alone. The extended and daily increasing use of the portable engine by builders and contractors is one of these importations from agricultural engineering. Many other machines could be used in building, and to the exhibits belonging to our vocation that we noticed in the Islington Agricultural Hall, we propose to confine our attention.

By a somewhat thoughtless piece of mismanagement on the part of the Club, several noted exhibitors,—such as Clayton & Co., of brickmaking machine notoriety; and Clinton & Owens, the hydraulic engineers,—were absent from the show. Last year, the 1st of November was fixed upon as the last day for entering the things to be exhibited. With no previous notice to this effect, the last day of application to exhibit was advanced by a month. Many intending exhibitors were thus unconsciously too late.

Foremost in every exhibition of this kind are, of course, the portable engines, and this year's Smithfield Club Show forms no exception. The number of portable engines at work in England alone cannot be estimated under 6,000. It is within our own knowledge that a single firm,—Clayton & Shuttleworth, of Lincoln,—have turned out as many as 5,500 engines of this description. Many of these engines have been, of course, made for the export trade. Messrs. Clayton & Shuttleworth exhibited at the show which closed yesterday (Friday) seven portable engines, varying from 4-horse power to 12-horse power nominal. The excellent design of these engines undoubtedly accounts for their unexampled success with English and foreign purchasers.

The workmanship, details, and general arrangement are only inferior to the best class of locomotive work. The strong and elegant hollow crank-shaft brackets, the well-proportioned connecting-rod, the adjustible slide-blocks and crank-shaft bearings, besides other details, make this engine the best in the trade, and a model for the exercise of the imitative faculties of the smaller makers. A larger importation, however, of recent locomotive design, would distance these rivals. To make the firebox flush with the boiler, at the same time giving extra steam-space to the barrel, in order to prevent priming; to forge and cast the oil-cups on the connecting-rods, and the eccentric straps respectively; to counterbalance the reciprocating parts by a strip cast on the fly-wheel, would be improvements that we hope to see carried out on the Stamp End engine. But few of the other agricultural engines are worthy any criticism. When we see such mechanical monstrosities and antiquities as the use of "classical" pillars to carry a crank-shaft; round slide-bars, long ago condemned for the purpose by their inapplicability to a lateral strain; a double crank placed in the exact centre between the two brackets, and thus far away from any bearing; a connecting-rod crosshead screwed on a piston-rod; a fly-wheel pulley placed on the side furthest from the crank; firebox-stays with countersunk heads,—without completing our roll of indictment, we are compelled to assume, that making horse-ploughs and thrashers is not a good preparation for designing steam-engines.

A form of the steam-engine destined to be of great importance to the building trades, is that of the traction, or self-propelling engine. In many situations the use of a steam-engine that could be used as required, for conveying materials, for sawing, for hoisting, and other operations, would be a fortune in itself. It is to be hoped that the absurd regulations of Sir George Grey, with respect to traction engines, will be sooner or later repealed. If horses can be taught to stand fire, they can be taught to pass an engine without starting. A great impulse to the use of these engines is, however, due to the demand for a self-propelling engine in steam ploughing. Substantially, these light traction engines are simply portable engines, furnished with either gearing or a pitch chain—generally the latter—communicating motion to the pair of hind wheels; and the whole provided with an arrangement for steering. Of course, many other minor accessories are required to adapt a portable engine to the road; but the above are the main features of this class of engine. The traction engine is not a novelty. Many engineers, amongst whom we may reckon Mr. Scott Russell, have attempted to place steam on common roads. Mr. Hancock was very successful in this way, as will be remembered by some of our older readers. The union of the wheel and the rail, however, soon stifled all these attempts, and it has needed the introduction of steam-ploughing, and the daily increasing application of steam for all purposes, to revive the use of steam on common roads. Without much considering what had been previously achieved, a very large number of clumsy and even ridiculous designs for traction engines have been put forward at these agricultural shows. The engine, the construction of which witnesses to a thorough appreciation of its intended purpose, is that of Messrs. Aveling & Porter, of Rochester. The engine is driven by a strong steel pitch-chain, and, as the chain wears, the slack is taken up by setting the counter-shaft, which turns on a pair of adjustible gun-metal bearings, working in radial slots. The steering apparatus simply consists of a single steering and carrying wheel, caused to swivel by the steersman in front, at the end of a light wrought-iron frame fixed to the front end of the smoke-box. Our limits forbid us to enlarge further upon this excellent form of traction-engine; but we may state that we have seen one of these engines drag 20 tons up an incline of 1 in 8, at a speed of about 2 miles an hour. We believe that no less than ninety have been already made at Rochester for the home and export trade.

At Messrs. Brown & May's stand we noticed a mill for crushing cement, flint-stone, and similar substances. It is upon what might be called an absurdly simple plan, but, like most simple machines, it is remarkably efficient and cheap. A pair of rollers are fitted with a frame; in the more powerful machines, two pairs, placed one above the other, are used. These rollers—of chilled cast iron—are cast with alternate V grooves, the V's or projections of one roller working into the projections of the roller opposite, thus, ΛV. One roller is driven at a different speed to the other. We understand that the veteran engineer, the well-known Mr. Richard Roberts, took a great interest in this simple machine.

At stand No. 1 was exhibited a model of a curious plan for raising, lowering, and transporting goods to and from a warehouse. The idea seemed to be taken from Mr. Fowler's steam ploughing tackle. Two strong wire ropes, or chains, are stretched on pulleys, at an angle between the warehouse, and, for instance, a vessel lying alongside a quay. The goods to be transported are suspended from this endless rope, and are moved to and fro as required by means of one of the pulleys being driven by steam or other power. Whether the rope will not have a tendency to slip out of the pulleys through the down strain, is a question to be determined by actual trial. For light weights this plan may be very useful in some situations; but the down pull must clearly be very heavy on the centre of the long endless rope used in this arrangement.

As was natural, a great variety of fencing was exhibited. W. S. Underhill's fence (stand No. 13) is formed out of broad horizontal bars, with slits or notches for the upright rods to pass through—an ingenious plan, likely to make a very cheap and strong kind of fencing. Hill & Smith (stand No. 117) exhibited various fences formed with hollow galvanized plate-iron pillars, and strongly strained where required by a worm and wheel. Our contemporary, *Punch*, alluded a week or two ago to the annoyance to fox-hunters caused by wire fences. *Punch* recommends that wire fences should be taken up and replaced every year. We doubt whether farmers will follow his advice. Apart from the expense of the proceeding, the bundle of wires would untwist and get ruined while lying on the ground, and the fence would not merely have to be again erected, but would have to be perhaps replaced.

A simple rotary screen, on wheels, for screening gravel, formed of iron rods placed parallel to the axis of the machine, was also to be seen at this stand. The mesh was $\frac{5}{16}$ in., but every alternate rod could be taken out to increase the mesh for coarse work.

The last-mentioned stand was in the galleries. Continuing our tour round these, we noticed that Mr. A. B. Childs, one of the principal exhibitors in this country of American mechanical "notions," exhibited a useful implement, "a post-hole auger," a tool said to "combine all the advantages of the shovel, spade, and post-spoon," in the operation of digging holes for erecting posts. It was formed like a wood auger on a large scale; and, furnished with a long handle, it can be lifted out of the ground, thus bringing up the soil, and leaving a clean round hole. We also noticed a pick-axe, formed without an eye. An iron socket is fixed on the handle of the pick, into which it slips, and is keyed fast by a key or wedge. This pick is stated to be used by the Federal armies. An ingenious American log sawing-machine was also shown at this stand. The saw in this machine is worked by a simple contrivance,—scarcely, however, to be made clear without a drawing. The saw while reciprocating is enabled to radiate, and to thus adapt itself to the progress of the work.

We noticed another American invention that has enjoyed some success in England. It is that of the ingenious form of a pump, known under the name of "California Pump." The chief peculiarity and advantage of this pump consist in its valves being very easily accessible. The barrel is placed horizontally, the valves are above, and by taking off the air vessel on the top of the latter, ready access is obtained to the whole.

The well-known deferential pulley-blocks patented under the name of Weston, were shown by several exhibitors. These pulley-blocks are on the principle of what has been known for many years as the "Chinese windlass;" viz., an axis, on which are fixed two cylinders of different diameters: when the axis revolves, one end of a cord is coiled round (say) the larger cylinder, while the other end is uncoiled from the smaller cylinder. The contrivance in this shape has not been used in practice, from the very great quantity of rope required. The improved apparatus patented by Mr. Weston was completely described—as was lately pointed out by a correspondent to a contemporary,—some twenty years ago, in a work on Mechanics. It is also stated that the contrivance in its perfected shape was noticed on a drawbridge at Pekin, during the late occupation of that city by the Anglo-French forces. Instead of using a rope, an endless chain is applied to teeth cast on a double sheave of two different diameters. The weight would necessarily remain stationary if the chain passed over sheaves of equal diameters; but one sheave being of a larger diameter, it takes up more chain, and the weight is raised in the same proportion. The objection to this contrivance is, that it cannot be well applied in situations where the loads vary considerably, as the speed of the apparatus can never be much quickened with a smaller weight. Its great advantage consists in the perfect freedom from the danger of running down; and no doubt builders might use it oftener than is at present the case.

Amongst a number of these pulleys, and in company with such useful domestic articles as "perpetual automaton mouse-traps" and patent sausage-making machines, exhibited by Messrs. S. & E. Ransome, we noticed a novel form of hand-truck, for conveying sacks or bales. It is not easy to push an ordinary hand-truck under a heavy bale; the loose wheels have a tendency to roll the barrow back. This is prevented in Mr. Wilmott's contrivance by fitting a simple form of self-acting locking gear to the axle. The ordinary axle is fitted with a pair of cogs on each side, and, kept out of gear from the cogs by means of a spring, is placed a bar. The pressure of the foot causes this bar to lock into the wheels: its removal allows the wheels to roll as usual.

Mr. Sawney (stand No. 101) exhibited a very neatly arranged grindstone,—fixed on a wrought-iron framing and worked by a treadle,—likely to be of use to some of our readers.

Moore's ingenious ventilators were shown at Stand No. 84. These ventilators, as our readers know, can be easily applied to stained-glass church windows.

Different kinds of apparently excellent roofing felts, stable fittings, hydropults, and similar exhibits, were also to be seen in the gallery.

IRON-WORKERS AND TOOL-MAKERS.*

CORT—MUSHET—NASMYTH.

WHEN a Frenchman in conversation with Sir John Sinclair praised the artist who invented ruffles, the baronet shrewdly remarked that some little merit was also due to the man who added the shirt. The ornamental ought ever to be based on the useful. Without derogating from the bio-

* Industrial Biography: Iron-workers and Tool Makers. By Samuel Smiles. London: Murray. 1863.

graphic claims of those who minister to taste and intellect, those who minister to utility need not be overlooked. It is true that taste and ornamental display may be admitted to rank in some respects a little higher in the scale of civilization than mere utility; which may, therefore, in these respects, be looked down upon as of a more *basal* though not of a *baser* order. But we are not going to admit the inferiority, in any one essential point, of utility to beauty, even as a token of advancement in civilization. Not unfrequently it is useless ornament, and beauty in trifles, which attract the eye and please the taste of the savage rather than things of solid utility. Yet this is not always the case. When Captain Cook and the early navigators first sailed into the South Seas, old nails and old hoops soon rose to a high premium; an old anchor which accidentally turned up became a mass of bullion in the bank, and represented an immense equivalent of provisions and other valuables. Who were the more really savage,—these poor but sensible islanders, or those great discoverers of America who committed such dreadful excesses for the sake of that gold which the Mexicans and Peruvians comparatively despised?

We not only rank our iron-workers and our tool-makers as a most useful order of men, but as men of a high rank in civilization. It is to these very men indeed, that England owes its present greatness as a civilized nation. It is upon *their* shirt that the ruffles have been stitched.

Mr. Smiles, while preparing his "Lives of the Engineers," came frequently across the tracks of celebrated inventors, mechanics, and iron-workers,—the founders, in a great measure, of the modern industry of Britain,—whose labours seemed to him well worthy of being traced out and placed on record; and the more so as their lives presented many points of curious and original interest. By the help of various contributions from eminent living and lately deceased mechanical engineers, he has just produced another interesting, though not unassailable volume; the saleable merits, at least, of which new issue may be judged of by the fact that the London booksellers alone purchased ten thousand copies of it before it was published.

The work is divided into sixteen chapters, the headlines of which are as follows:—Iron and Civilization; Beginnings of the Iron Manufacture in Great Britain; Iron Smelting by Pit-Coal—Dud Dudley; Andrew Yarrington; Coalbrook Iron-works—The Darbys and Reynoldses; Invention of Cast-Steel—Benjamin Huntsman; The Inventions of Henry Cort; The Scotch Iron Manufacture — Dr. Roebuck — David Mushet; Invention of the Hot Blast—James Beaumont Neilson; Mechanical Inventions and Inventors; Joseph Bramah; Henry Maudslay; Joseph Clement; Fox, of Derby—Murray, of Leeds—Roberts and Whitworth, of Manchester; James Nasmyth; and William Fairbairn.

It is not easy to select from these biographical sketches those of most interest; for all are interesting; but, being desirous of gleaning a few weighty heads from Mr. Smiles's abundant sheaf, we shall select—say Cort, Mushet, and Nasmyth, as the names to which we shall restrict our attention. We shall leave others to point out the weaknesses of the book.

Henry Cort was born in 1740, at Lancaster, where his father carried on the trade of a builder and brickmaker. Nothing is known of Henry's early history; but he seems to have raised himself by his own efforts to a respectable position. In 1765 we find him established in Surrey-street, Strand, carrying on the business of a navy agent, in which he is said to have realized considerable profits. It was while conducting this business that he became aware of the inferiority of British iron compared with that obtained from foreign countries. The English wrought-iron was considered so bad that it was prohibited from all Government supplies, while the cast-iron was held to be of too brittle a nature to be suited for general use. Indeed, the Russian Government became so persuaded that the English nation could not carry on their manufactures without Russian iron, that in 1770 they ordered the price to be raised from 70 and 80 copecs per pood to 200 and 220 copecs per pood. The Russian's greed was great but his sense was small; for he thereby stimulated the inventive genius of Cort, and laid the solid foundations of England's greatness as the iron workshop of the world. As in other inventions, Cort took up the manufacture of iron at the point to which his predecessors had brought it; standing on their shoulders, as it were, and seeing over their heads; improving upon their processes and carrying their discoveries still farther afield. Cort published his patents in 1783 and 1784. In dispensing with the blast, he had been anticipated by the Craneges, and in the process of puddling by Onions; but he introduced so many improvements of an original character, with which he combined the inventions of his predecessors, as to establish quite a new era in the history of the iron manufacture; and, in the course of a few years, to raise it to the highest state of prosperity. As early as 1786, Lord Sheffield recognised the great national importance of Cort's improvements in the following words:—"If Mr. Cort's very ingenious and meritorious improvements in the art of making and working iron, the steam-engine of Boulton & Watt, and Lord Dundonald's discovery of making coke at half the present price, should all succeed, it is not asserting too much to say that the result will be more advantageous to Great Britain than the possession of the thirteen colonies [of America]; for it will give the complete command of the iron trade to this country, with its vast advantages to navigation." It is scarcely necessary here to point out how completely the anticipations of Lord Sheffield have been fulfilled, sanguine though they might appear to be when uttered some seventy-six years ago.

We cannot here discuss the merits, or even recapitulate the details, of Cort's inventions of puddling and rolling iron, and must hasten to the sad end of his story. Everything seemed to be getting on swimmingly with him for a time. He was patronised by the Admiralty, and the merits of his inventions were generally conceded. Numerous contracts for licenses were entered into with Cort and his partner, Mr. Jellicoe, by the manufacturers of bar-iron throughout the country. Cort himself made arrangements for carrying on the manufacture on a large scale, and with that object entered upon the possession of a wharf at Gosport, belonging to Adam Jellicoe, his partner's father, where he succeeded in obtaining considerable Government orders for iron made after his patents. To all ordinary eyes the inventor now appeared to be on the high road to fortune; but there was a fatal canker at the root of this seeming prosperity, and in a few years the fabric which he had so laboriously raised crumbled into ruins.

On the death of Adam Jellicoe, who was a Government *employé*, defalcations were discovered in his public accounts to the extent of 39,676*l.*, and his books and papers were immediately taken possession of by the Government. On examination it was found that the debts due to Jellicoe amounted to 89,657*l.*, included in which was a sum of not less than 54,853*l.* owing to him by the Cort partnership. In the public investigation which afterwards took place, it appeared that the capital possessed by Cort being insufficient to enable him to pursue his experiments, which were of a very expensive character, Adam Jellicoe had advanced money from time to time for the purpose, securing himself by a deed of agreement entitling him to one-half the stock and profits of all his contracts; and in further consideration of the capital advanced by Jellicoe beyond his equal share, Cort subsequently assigned to him all his patent rights as collateral security. As Jellicoe had the reputation of being a rich man, Cort had not the slightest suspicion of the source from which he obtained the advances made by him to the firm; nor has any connivance whatever on the part of Cort been suggested. At the same time it must be admitted that the connexion was not free from suspicion; and, to say the least, it was a singularly unfortunate one.

The result was that the assignments of Cort's patents, which had been made to Jellicoe in consideration of his advances, were taken possession of; but Samuel Jellicoe, the son of the defaulter, singular to say, was put in possession of the properties at Fontley and Gosport, and continued to enjoy them, to Cort's exclusion, for a period of fourteen years. It does not, however, appear that any patent right was ever levied by the assignees; and the result of the proceeding was that the whole benefit of Cort's inventions was thus made over to the ironmasters and to the public. Had the estate been properly handled, and the patent rights due under the contracts made by the ironmasters with Cort been duly levied, there is little reason to doubt that the whole of the debt owing to the Government would have been paid in the course of a few years.

In a report made by commissioners to the Houses of Parliament in 1805, the value of Cort's patents was estimated at 100*l.*! Referring to the schedule of Jellicoe's alleged assets, they say, "Many of the debts are marked as bad; and we apprehend that the debt from Mr. Henry Cort, not so marked, of 54,000*l.* and upwards, is of that description." As for poor bankrupt Henry Cort, these discussions availed nothing. On the death of Jellicoe, he left his ironworks, feeling himself a ruined man. He made many appeals to the Government of the day for restoral of his patents, and offered to find security for payment of the debt due by his firm to the Crown, but in vain. In 1794 an appeal was made to Mr. Pitt by a number of influential members of Parliament, on behalf of the inventor and his destitute family of twelve children, when a pension of 200*l.* a-year was granted him. This Mr. Cort enjoyed until the year 1800, when he died, broken in health and spirit, in his sixtieth year. He was buried in Hampstead churchyard, where a stone marking the date of his death is still to be seen. A few years since it was illegible, but it has recently been restored by his surviving son.

"Though Cort," says Mr. Smiles, "thus died in comparative poverty, he laid the foundations of many gigantic fortunes. He may be said to have been in a great measure the author of our modern iron aristocracy, who still manufacture after the processes which he invented or perfected, but for which they never paid him a shilling of royalty. These men of gigantic fortunes have owed much—we might almost say everything—to the ruined projector of 'the little mill at Fontley.' Their wealth has enriched many families of the older aristocracy, and has been the foundation of several modern peerages. Yet Henry Cort, the rock from which they were hewn, is already all but forgotten; and his surviving children, now aged and infirm, are dependent for their support upon the slender pittance wrung by repeated entreaty and expostulation from the state."

David Mushet was born at Dalkeith, near Edinburgh, in 1772. Like other members of his family he was brought up to metal founding. At the age of nineteen he joined the staff of the Clyde ironworks, near Glasgow; and here, though acting merely as an accountant, he practised assaying, and became so skilled in it that he was consulted in difficulties; but at length the manager, whether from envy, caprice, or because Mushet might thereby be *idling* away his time as an accountant, ordered his furnaces to be pulled to pieces. Elsewhere, however, he quietly erected new ones for himself, and continued his experiments even while he remained at the Clyde works. Afterwards he became a partner in the Calder ironworks, which he and his partners erected. About this time (1801) he made the discovery of the celebrated black band ironstone by means of his assaying skill; and great prejudice was excited against him by the ironmasters and others of that day in presuming to class the *wild coals* of the country (as Black Band was called) with ironstone fit and proper for the blast furnace. Yet that discovery has elevated Scotland to a considerable rank among the iron-making nations of Europe, with resources still in store that may be considered inexhaustible.

"But such," he himself remarks, "are the consolatory effects of Time, that the discoverer of 1801 is no longer considered the intrusive visionary of the laboratory, but the acknowledged benefactor of his country at large, and particularly of an extensive class of coal and mine proprietors and iron masters, who have derived, and are still deriving, great wealth from this important discovery; and who, in the spirit of grateful acknowledgment, have pronounced it worthy of a crown of gold, or a monumental record on the spot where the discovery was first made.

At an advanced period of life, such considerations are soothing and satisfactory. Many under similar circumstances have not, in their own lifetime, had that measure of justice awarded to them by their country to which they were equally entitled. I accept it, however, as a boon justly due to me, and as an equivalent in some degree for that laborious course of investigation which I had prescribed for myself, and which, in early life, was carried on under circumstances of personal exposure and inconvenience, which nothing but a frame of iron could have supported. They atone also, in part, for that disappointment sustained in early life by the speculative habits of one partner, and the constitutional nervousness of another, which eventually occasioned my separation from the Calder Ironworks, and lost me the possession of extensive tracts of black band ironstone, which I had secured while the value of the discovery was known only to myself."

Among the other important results of Mr. Mushet's lifelong labours, the following may be summarily mentioned:—The preparation of steel from bar-iron by a direct process, combining the iron with carbon; the discovery of the beneficial effects of oxide of manganese on iron and steel; the use of oxides of iron in the puddling-furnace in various modes of appliance; the production of pig-iron from the blast-furnace, suitable for puddling, without the intervention of the refinery; and the application of the hot blast to anthracite coal in iron-smelting. For the process of combining iron with carbon for the production of steel, Mr. Mushet took out a patent in 1800; and many years after, when he had discovered the beneficial effects of oxide of manganese on steel, Mr. Josiah Heath founded upon it his celebrated patent for the making of cast-steel, which had the effect of raising the annual production of that metal in Sheffield from 3,000 to 100,000 tons. His application of the hot blast to anthracite coal,

after a process invented by him and adopted by the Messrs. Hill, of the Plymouth Ironworks, South Wales, had the effect of producing savings equal to about 20,000*l.* a year at these works; and yet, strange to say, Mr. Mushet himself never received any consideration for his invention.

While he lived, Mr. Mushet was a leading authority on all matters connected with iron and steel, and he contributed largely to the scientific works of his time. He died in 1847.

James Nasmyth belongs to a family whose genius in art has long been recognised. His father, Alexander Nasmyth, of Edinburgh, was a landscape painter of great eminence, whose works are sometimes confounded with those of his son Patrick, called the English Hobbema, though his own merits are peculiar and distinctive. The elder Nasmyth was also an admirable portrait-painter, as his head of Burns—the best ever painted of the poet—bears ample witness. His daughters, the Misses Nasmyth, were highly skilled painters of landscape, and their works are well known and much prized. James, the youngest of the family, inherits the same love of art, though his name is more extensively known as a worker and inventor in iron. He was born at Edinburgh on the 19th of August, 1808; and his attention was early directed to mechanics by the circumstance of this being one of his father's hobbies. Amongst the visitors at his father's studio were Professor Leslie, Patrick Miller, of Dalswinton, and other men of distinction. The elder Nasmyth assisted Mr. Miller in his early experiments with paddle-boats, which eventually led to the invention of the steamboat. It was a great advantage for the boy to be trained by a father who so loved excellence in all its forms, and could minister to his love of mechanics by his own instruction and practice. James used to drink in with pleasure and profit the conversation which passed between his father and his visitors on scientific and mechanical subjects; and as he became older, the resolve grew stronger on him every day that he would be a mechanical engineer, and nothing else.

His first essay at making a steam-engine was when he was only fifteen years old. He then made an actual working engine, 1¾-inch diameter cylinder, and 8-inch stroke, which not only could act, but did some really useful work, for he made it grind his father's oil colours. He afterwards made many models to order; and some friends having supplied him with money he built, at a cost of 60*l.*, in 1828, a steam carriage, which ran many a mile with eight persons on it. Afterwards he sold it, and the engine was used in driving a small factory. In this engine, Mr. Nasmyth states that he used the waste steam to increase the draught through the chimney, not aware that George Stephenson had some years before made the same vitally important discovery. The summit of Nasmyth's ambition was to get into Maudslay's establishment in London; but as his father could not pay a premium, the lad created his own premium in the shape of a small steam-engine, every part of which was the result of his own handiwork, including the casting and the forging of the whole. With this he went hopefully to London in a Leith smack, which took eight days on its voyage. The engine was exhibited to Henry Maudslay, and Nasmyth was at once appointed to act as Maudslay's own private workman, at a salary modestly fixed by Nasmyth himself, at 10s. a week, out of which he had to pay 3s. for lodging. He contrived a small cooking apparatus, however; and managed, he says, to keep the eating and drinking department within 3s. 6d. a week. "I have the old apparatus by me yet," he says, in 1862, "and I shall have another dinner out of it ere I am a year older, out of regard to days that were full of the real romance of life." In a brief sketch written by himself, from which we quote, Mr. Nasmyth gives the following rapid note of his subsequent career:—

"On the death of Henry Maudslay in 1831, I passed over to the service of his worthy partner, Mr. Joshua Field, and acted as his draughtsman, much to my advantage, until the end of that year, when I returned to Edinburgh, to construct a small stock of engineering tools for the purpose of enabling me to start in business on my own account. This occupied me until the spring of 1833; and during the interval I was accustomed to take in jobs to execute in my little workshop in Edinburgh, so as to obtain the means of completing my stock of tools. In June, 1834, I went to Manchester, and took a flat of an old mill in Dale-street, where I began business. In two years my stock had so increased as to overload the floor of the old building to such an extent that the landlord, Mr. Wrenn, became alarmed, especially as the tenant below me—a glass-cutter—had a visit from the end of a 20-horse engine beam one morning among his cut tumblers. To set their anxiety at rest, I went out that evening to Patricroft and took a look at a rather choice bit of land bounded on one side by the canal, and on the other by the Liverpool and Manchester Railway. By the end of the week I had secured a lease of the site for 999 years: by the end of the month my wood sheds were erected: the ring of the hammer on the smith's anvil was soon heard all over the place; and the Bridgewater Foundry was fairly under way. There I toiled right heartily until December 31st, 1856, when I retired to enjoy in active leisure the reward of a laborious life, during which, with the blessing of God, I enjoyed much true happiness through the hearty love which I always had for my profession; and I trust I may be allowed to say, without undue vanity, that I have left behind me some useful results of my labours in those inventions with which my name is identified, which have had no small share in the accomplishment of some of the greatest mechanical works of our age."

If Mr. Nasmyth had accomplished nothing more than the invention of his steam-hammer, it would have been enough to found a reputation.

The history of this hammer is an interesting and instructive one. In 1838, the engineer of the company who were about to build the *Great Britain*,—the first of the big ships,—wrote to Nasmyth, complaining that there was not a forge hammer in existence powerful enough to forge the paddle-shaft of the engine; and asking Nasmyth what he should do: did he think he might dare to use cast iron? Instantly the idea of the steam-hammer flashed into Nasmyth's mind; and, in a few minutes, a sketch of it was on paper. Mr. Brunel and others heartily approved of it; but the paddle-shaft for which it was so promptly invented never was forged at all: the screw was then attracting attention, and was adopted in preference to the paddle; and the steam-hammer was left to bide its time, in the hands of him whose ancient family *arms*, strange to say, were a sword between two hammers, with broken shafts, and the motto "Non Arte sed Marte;" the founder of the family, at least under the name of Naesmyth, having taken refuge, on some political emergency, in a smith's shop, and set to work so awkwardly with the smith's hammer, that it became manifest at once to his enemies, "the Douglas men," that he was "nae smyth," and he had to show them that he was at all events a swordsman, and fairly routed the Douglas men. The king bestowed a grant of land on his follower who was Nae Smyth, and he then assumed the armorial bearings just spoken of. When the steam-hammer became a power in the world, Nasmyth, by a remarkable antithesis, reversed the motto of the family into "Non Marte sed Arte," and displaced the sword and the broken hammers, for which his own magnificent steam-hammer was substituted. A more curious heraldic anecdote, we are sure, was never told.

Many unsuccessful attempts were made to introduce the steam-hammer. No forge master would take it up. The inventor wrote in vain to all the great firms, urging its superiority to every other tool for working malleable iron into all kinds of forge work. His own partner, Mr. Gaskell, at Patricroft, declined to have anything to do with it, or even to assist him to patent it. An intelligent Frenchman, M. Bourdon, came, upon one occasion, to Patricroft, to purchase tools; and among other things incidentally shown to him by Mr. Gaskell was Nasmyth's sketch of his steam-hammer, which Mr. Gaskell, however, never once thought of even mentioning to Nasmyth (who was absent at the time) that he had done. In 1840, Mr. Nasmyth happened to take a trip to France, and called upon his customer, M. Bourdon. In passing through his works at Creusot, just as M. Bourdon had done at Patricroft, Nasmyth happened to see a great crank shaft, not only forged in the piece, but punched. Wondering, Nasmyth asked him how he got that shaft forged. "Why, with your own hammer, to be sure!" said M. Bourdon. Great indeed was Nasmyth's astonishment; for he had never yet seen his own hammer, except in his own sketch; nor had he ever been told that M. Bourdon knew anything about it.

"M. Bourdon said he had been so much struck with the ingenuity and simplicity of the arrangement, that he had no sooner returned than he set to work, and had a hammer made in general accordance with the design Mr. Gaskell had shown him; and that its performances had answered his every expectation. He then took Mr. Nasmyth to see the steam-hammer; and great was his delight at seeing the child of his brain in full and active work."

On reaching England, Mr. Nasmyth at once wrote to his partner telling him what he had seen, and urging that the taking out of a patent for the protection of the invention ought no longer to be deferred. But trade was still very much depressed; and as the Patricoft firm needed all their capital to carry on their business, Mr. Gaskell still objected to lock any of it up in engineering novelties. Seeing himself on the brink of losing his property in the invention, Mr. Nasmyth applied to his brother-in-law, Mr. William Bennett, who advanced him the requisite money for the purpose — about 280*l.*, — and the patent was secured in June 1840.

"The first hammer, 30 cwt., was made for the Patricroft works, with the consent of the partners; and in the course of a few weeks it was in full work. The precision and beauty of its action—the perfect ease with which it was managed, and the untiring force of its percussive blows—were the admiration of all who saw it; and from that moment the steam-hammer became a recognised power in modern mechanics. The variety or gradation of its blows was such, that it was found practicable to manipulate a hammer of ten tons as easily as if it had only been of ten ounces weight. It was under such complete control that while descending with its greatest momentum, it could be arrested at any point with even greater ease than any instrument used by hand. While capable of forging an Armstrong hundred-pounder, or the sheet anchor for a ship of the line, it could hammer a nail, or crack a nut without bruising the kernel. When it came into general use, the facilities which it afforded for executing all kinds of forging had the effect of greatly increasing the quantity of work done, at the same time that expense was saved. The cost of making anchors was reduced by at least 50 per cent., while the quality of the forging was improved. Before its invention the manufacture of a shaft of 15 or 20 cwt. required the concentrated exertions of a large establishment, and its successful execution was regarded as a great triumph of skill; whereas forgings of 20 or 30 tons weight are now things of almost every-day occurrence. Its advantages were so obvious, that its adoption soon became general, and in the course of a few years Nasmyth's steam-hammers were to be found in every well-appointed workshop both at home and abroad. Many modifications have been made in the tool, by Condie, Morrison, Naylor, Rigby, and others; but Nasmyth's was the father of them all, and still holds its ground."

Mr. Nasmyth, since he retired from business at the close of 1856, has occupied his leisure in the pursuit both of art and of science.

"That he possesses remarkable fertility of imagination, and great skill in architectural and landscape drawing, as well as in the much more difficult art of delineating the human figure, will be obvious to any one who has seen his works,—more particularly his 'City of St. Ann's,' 'The Fairies,' and 'Everybody for ever!' which last was exhibited in Pall Mall, among the recent collection of works of Art by amateurs and others, for relief of the Lancashire distress. He has also brought his common sense to bear on such unlikely subjects as the origin of the cuneiform character. The possession of a brick from Babylon set him a thinking. How had it been manufactured? Its under side was clearly marked by the sedges of the Euphrates upon which it had been laid to dry and bake in the sun. But how about those curious cuneiform characters? How had writing assumed so remarkable a form? His surmise was this;—that the brickmakers, in telling their tale of bricks, used the triangular corner of another brick; and, by pressing it down upon the soft clay, left behind it the triangular mark which the cuneiform character exhibits. Such marks repeated, and placed in different relations to each other, would readily represent any number. From the use of the corner of a brick in writing, the transition was easy to a pointed stick with a triangular end, by the use of which all the cuneiform characters can readily be produced upon the soft clay. This curious question formed the subject of an interesting paper read by Mr. Nasmyth before the British Association at Cheltenham."

But the most engrossing of Mr. Nasmyth's later pursuits has been the science of astronomy, in which, by bringing a fresh, original mind to the observation of celestial phenomena, he has succeeded in making one of the most remarkable discoveries of our time. Astronomy was one of his favourite pursuits at Patricroft, and on his retirement became his serious study.

The most remarkable result of his astronomical pursuits is the discovery, confirmed by others, and accredited by Sir John Herschell and other eminent astronomers, that the bright surface of the sun consists of separate, insulated, individual objects or things, all nearly or exactly of one certain definite size and shape, which is more like that of a willow leaf, as he describes them, than anything else.* These leaves or scales are not arranged in any order (as those on a butterfly's wing are), but lie crossing one another in all directions, like what are called spills in the game of spillikins; except at the borders of a spot, where they point for the most part inwards towards the middle of the spot, presenting much the sort of appearance that the small leaves of some water-plants or sea-weeds do at the edge of a deep hole of clear water. The exceedingly definite shape of these objects, their exact similarity to one another, and the way in which they lie across and athwart each other (except where they form a sort of bridge across a spot, in which case they seem to affect a common direction, that, namely, of the bridge itself),—all these characters seem quite repugnant to the notion of their being of a vaporous, a cloudy, or a fluid nature.

Long may James Nasmyth enjoy his active leisure.

* In connection with this very strange subject, it is rather a singular coincidence that those till recently much-despised philosophers, the alchemists, who speak of their red elixir, or golden (mineral) branch, as "Sol" call it also "the royal herb *or willow*." This may be a mere accidental coincidence; but it is at least curious, and worthy of a note in passing; as also is the still more strange discovery, by the Rev. Mr. Howlett, of a congeries of solar spots which he described as happening (probably accidentally) to assume the form of a tremendous skeleton, some thousands of miles in length.

THE NEW THEATRE ROYAL, GLASGOW.

The new theatre for Glasgow is now nearly completed, and will accommodate about 3,600 persons. The upper boxes and the lower and upper galleries of the old house are superseded by an amphitheatre. The stairs leading to the amphitheatre are 7 feet 6 inches in width. The theatre is in the form of an almost perfect circle, having a diameter of 42 feet, the radius from the centre to the box front being 21 feet. Around this circle the box, amphitheatre, and gallery audience are disposed, each seat directly fronting and commanding an easy view of the area available for stage business. An area of 3 feet 3 inches by 22 inches has been allotted each person in stalls and boxes, and all the seats will be divided by arms. The use of the "sunlight" has been determined on. Iron piping is to be introduced throughout every part of the house, to prevent, as far as possible, the possibility of accident by the escape of gas. No gaseliers will be used. The stage plan, and arrangements behind the scenes, have been directed by Mr. William Glover. The stage has been constructed by Mr. Drummond, the machinist of the theatre. The proscenium opening has been enlarged to 33 feet, and is flanked with pilasters, between which are placed the private boxes. A semi-circular arch spans the proscenium opening, the arch being supported on ornate brackets, and the panels enriched with ornamentation. The height from the stage to the crown of the arch is 45 feet. The level portion of the ceiling will be 42 feet in diameter, forming a circle of the exact circumference of the box frontage. The painting-room is 44 feet square by 30 feet high, and presents three sides of wall of great extent. The ornamental work for the box fronts, ceiling, and proscenium, is being made by Messrs. Jackson & Sons, London. The contractors are Mr. Robert Taylor, builder, West Nile-street; and Mr. John Taylor, joiner, George-street. The architects are Messrs. Potts & Son, of Sunderland.

SKETCHES AND STUDIES: SOCIETY OF PAINTERS IN WATER-COLOURS.

This second Winter Exhibition by the members of the "Old Society," comprising 384 sketches and studies, is even more interesting than the first, and the public have shown that they think so, the sales having been about double what they were at this time last year. Some of the artists, Mr. F. Tayler, Mr. Holland, and others, will not sell the sketches they exhibit, needing them for after-pictures. Perhaps two-thirds, however, of those sent were purchasable, and of these about ninety have been sold. A fresh source of income has been struck upon. It is to be hoped that it will not lead any into systematically "knocking off" a number of slight drawings for this special market instead of doing their best with perfected pictures. Some of the most finished bits sent are by Mr. Carl Haag and Mr. F. Smallfield, mostly admirable. Two or three of the members,—the veteran William Hunt, for example, who sends some exquisite bits,—make it the opportunity to show they are more versatile than their usual run of finished subjects would suggest. Mr. J. J. Jenkins is amongst the number: his capital landscape studies are an agreeable change from his pretty French fish-girls. Mr. Burton exhibits, besides a sketch for a large picture made some years ago, and other smaller works, his fine design for the "Fibula" given to Miss Helen Faucit at Dublin. Mr. John Gilbert, Mr. Birkett Foster, Mr. T. M. Richardson, Mr. E. Duncan, Mr. S. P. Jackson, Mr. A. P. Newton, and others, contribute strongly to the attractiveness of a collection that all should visit.

COMPETITIONS.

Halifax and Huddersfield Union Bank.—The design submitted by Messrs. Paull & Ayliffe, of Manchester, in a limited competition for this building, to be erected at Huddersfield, has been accepted by the directors. The new bank will stand upon a plot of ground in Westgate, near the Market-place, and will occupy a very commanding position in the heart of the town. The arrangements also include accommodation for the Huddersfield Chamber of Commerce. It is proposed to shortly commence the works, which will be carried out under the architects' superintendence. The proposed outlay is about 6,500*l.*

Wesleyan Chapel, Levenshulme.—The committee for the erection of this chapel, near Manchester, have selected the plans of Messrs. Paull & Ayliffe from a few designs sent in by local architects, and the building will be commenced forthwith under the architects' supervision. The style is the Decorated, and the cost will be about 3,000*l.*

THE ARCHITECTURAL MUSEUM.

PRIZES FOR WOOD CARVING.

The committee, in awarding the prizes, report as follows:—

"The committee of the Architectural Museum, after examining the *misereres* tendered for the wood-carving prizes of this year, which were offered for a composition of not more than two figures, or of one figure and one animal, the subject being a profession, trade, or occupation, treated in modern costume, assign the first prize of 20*l.* to the one marked with a red seal (author Mr. John Seymour, of Tower-lane, Taunton), the subject being a stonemason carving a vaulting rib of Ham-hill stone. This miserere appears to us commendable alike for the ease and anatomy of the figure, the accuracy with which modern costume has been reproduced in a graceful form, the truthfulness to fact of the tools, half worked block and stroke, and the flow with which the moulding of the seat ramifies into foliage. It is to be regretted that its author should have partially sand-papered the work, although he has obviously done so for effect and not to save work."

The Committee "assign the second prize of 5*l.* to the subject marked with a flower (author, Mr. J. M. Leach, of 1, Newmarket-road, Cambridge), representing a woman and child returning from gleaning, with sheaves on their heads. With much graceful treatment, and a comparative absence of sand-papering, this *miserere* is not equal to the stone-carver, either in anatomy or force. The figure of the woman and the child's bust are heavy, and the heavy flowing curls of the principal figure are untrue to actual peasant life."

"The committee allot an extra prize of 1*l.* 1s., or a book, at the choice of the competitor, to the carving marked 'Progress' (author, Mr. Alexander Kenmure, in the employ of Mr. Forsyth, of 8, Edward-street, Hampstead-road, London), representing a smith shoeing a horse. This clever composition fails in its practical applicability to the desired object. For instance, if it were really to be fixed as a *miserere* in any church the hammer and the bridle would soon be destroyed. Moreover, the *pose* of the horse is not consistent with fact, and the smith's expression fails in comparison with that of the mason in the first prize design. This work is not sand-papered."

"The joint committee of the Architectural Museum and the Ecclesiological Society have chosen 'The Gleaners' as the subject of the colour prize of this year, considering that the dresses of the woman and child, besides the sheaves, afford a better field for colouration than the carver working a block of stone."

A. J. B. Beresford Hope, President.
Joseph Clarke, Hon. Secretary.

THE ARCHITECTURAL UNION.

The sixth annual meeting of this company was held on Wednesday, at the House in Conduit-street, Regent-street, Mr. Charles Mayhew in the chair. Mr. Moody, the secretary, read the report, which congratulated the shareholders on the success of the undertaking, that the rooms and galleries of the company had been fairly let during the past year, and that negociations were in progress with several societies connected with architecture to rent portions of the commodious and convenient establishment. The gross income for the past year had been 1,660*l.*, and the expenditure, 1,161*l.*, leaving a balance of 499*l.*, from which the directors proposed to pay a dividend of 8s. per share, free of income-tax, leaving 84*l.*

The chairman, in moving the adoption of the report, referred to the mortgage of 4,000*l.* existing on their premises, and said it was under the consideration of the directors to propose the issue of preference shares, with a guaranteed dividend of 4 or 4½ per cent., for the purpose of raising money to pay off the mortgagee. Mr. Jennings seconded the adoption of the report, which was agreed to.

Messrs. W. Tite, M.P., Mayhew, Jennings, Lamb, C. C. Nelson, and Wood, the retiring directors, were re-elected, and also Messrs. Lockyer & Cockerell as auditors. A vote of thanks to the chairman and secretary closed the proceedings.

THE LATE MR. F. T. BELLHOUSE, ARCHITECT.

Many of our readers in the north of England, will regret to hear of the death of this gentleman. Mr. Frank Taylor Bellhouse was the third son of Mr. David Bellhouse, now of Sale, near Manchester, but whose name and that of the grandfather of Mr. F. T. Bellhouse, have been identified with building in Manchester for a great number of years. Mr. Edward T. Bellhouse, the brother of the subject of this notice, is well known to most of our readers as a mechanical engineer, who has carried into effect important works at home and abroad, many of which have given occasion for the exercise of inventive ability, which in a marked degree he possesses. Mr. F. T. Bellhouse began his professional studies in Manchester about the year 1835, or 1836, in the office of the late Mr. Thomas Witlam Atkinson, best known since as the Siberian traveller, and having for his contemporaries in the office, the late Mr. J. W. Hance, secretary of the original Manchester Architectural Society; Mr. Cuffley; Mr. R. B. Critchlow, now of Southampton; the late Mr. J. E. Gregan; Mr. Edward Hall, F.S.A., and others. Subsequently, or after having had the advantage of a short sojourn in his father's office, he commenced practice as an architect. Some few years since, he was induced to settle in London, having entered into a partnership. For the last one or two years, however, when the partnership had terminated, he occupied himself chiefly in drawing, whilst turning attention to artistic pursuits connected with the profession. In these, as in his previous labours,—which in London, included preparation of many sets of competition drawings, as for the Manchester Assize Courts, the rebuilding of Bowden Church, and the Hartley Institution, Southampton, which received our attention,—he showed much ability, and industry that was of an extraordinary kind. He died at his residence in Royal Crescent, Notting-hill, on the 6th inst., leaving a widow, and the remembrance with many, of a valued and dear friend.

ST. MARY'S, DOVER.

This is one of the very old parish churches of the land. It was first a little primitive fabric, with its eastern wall, or chancel arch, where the font now stands, and resting its foundations in Roman work: about midway, in Norman style, the tower and nave up to the present pulpit line were added; the two easternmost arches still show the Early English chancel and north chantry, added about the time of King John. The long gap that followed presents the usual account, till it became the merely dangerous ruin taken down and rebuilt by the vicar in 1843: the foundations being then relaid, the ancient part being preserved stone by stone, and set on its old basis of Roman baths; the south aisle and chancel doubled in extent, and the capacity raised from about 700 to 1,750, 1,300 being free seats. The past twenty years, however, having victimized one-half of the fabric to dry rot, thus much of the woodwork had to be once more renewed. When laid bare, the whole basement presented a complete study of the disease, with its nature, growth, contagion, and results; enforcing the old neglected lesson, free access for air from outside. While all this was being restored again, some special works were carried on by particular friends. The chancel has been recovered to as near its original limits as might be; the floor raised, and paved with encaustic tiles, which, with a more elaborate pavement for the sacrarium, were from the works of Messrs. Maw & Co.; the absence of any too sacred symbols under foot, the Early English vine leaves and scrolls, and good geometrical patterns, with bright colour, being the noticeable features. The chancel has also its oak seats, to be filled by a rising choir. And, lastly, the gas service has been supplied with brass standards, and carrying each a corona of seventeen lights, from the works of Messrs. Hart & Son. The church was re-opened a few days ago by the Archbishop of Canterbury, the offertory leaving good hope that the remainder of the vicar's debt will not linger very long.

THE LATE GALES.

On Wednesday and Thursday in last week the country was visited, as Admiral Fitzroy predicted from the Admiralty, by gales of such intensity as fairly to merit the name of hurricane, in which the wind seemed to come from all points of the compass. An immense amount of damage has been everywhere done, both in town and country. Chimney-stalks have been thrown down by hundreds, roofs blown off, new buildings demolished, houses crushed by the fall of chimney-stalks, windows blown in, telegraph wires broken, and trees rooted up. Not a few persons have been killed, and great damage has been done to shipping. At Brompton a house in course of erection was blown done. At Newington a tall stack of chimneys fell upon a cottage, destroying it and its contents, and killing a child and seriously injuring three others. A curious series of coincidences happened to Mr. Lowe, a hatmaker in Fleet-street. As he was proceeding along the Blackfriars-road, a stack of chimneys fell near his feet, and he immediately ran away; but on crossing the street he turned to look at what damage

had been done, when the stack of chimneys of the next house to him gave way, but fortunately he was uninjured. A message was received on the same day by Mr. Lowe that a stack of chimneys belonging to his own house, in West-square, had fallen down, carrying a portion of the flooring with it. A large chimney fell upon the roof of the Liverpool Exchange, and did considerable damage to the building. At Birkenhead a chimney 40 feet high was blown down. At Manchester a new house, nearly finished, was blown down at Longsight, and a high chimney at Pendleton was destroyed. At Peterborough one of the pinnacles of the cathedral was blown down into the bishop's garden, and the gable-ends of several houses were driven in by the gale, and stacks of corn strewn over the country.

At Chester a number of the spires of St. Mary's Church steeple, recently re-erected, were thrown down upon the roof, and into the interior of the church; and in Grosvenor-road a new Roman Catholic Chapel, just about finished, suffered severely, a portion of the roofs and walls having fallen. At Sheffield, a lofty chimney in Jessop-street fell; and at St. Helen's a large piece of brickwork, about 9 feet long, was forced out of the chimney of the St. Helen's Patent Alkali Company, one of the largest chimneys in England.

The storm extended to France. At Nantes, a house in course of erection was blown down, and the owner killed. At Louviers, a high chimney in the manufactory of M. Brunel was thrown down, wounding several workmen. At St. Malo, one of the small spires of the cathedral was blown down. At Paris, the storm did considerable damage in many localities. At the Palace of the Permanent Universal Exhibition, in course of erection at Auteuil, a wall, 150 mètres in length, and strengthened by twelve stone pilasters, was blown down, and greatly injured the other parts of the building in its fall. In the Rue de l'Université, a large chimney was blown down, and fell in the street. Slates and tiles, as in London and elsewhere, were flying about in all parts of the city.

A sufficient idea of the force of the hurricane in London may be gathered from the fact that the anemometer on the Royal Exchange registered a pressure of 30 lb. on the square foot. When we consider that the anemometer is in the heart of London, this is most extraordinary, we believe it is said to be unprecedented; and were it not that the anemometer had just had a thorough overhauling at the hands of Messrs. Negretti & Zambra, one might feel inclined to doubt the correctness of the indications. During the gales of last October, at Greenwich the anemometer of the same construction registered 35 lb., whilst the one on the Exchange only showed a pressure of 18 lb.

LABOURERS' AND WORKMEN'S COTTAGES, PENGE.

A LIBERAL LADY.

TWELVE cottages have recently been erected at Penge, below the Crystal Palace, by a benevolent resident, Miss A. Dudin Brown, who, observing the wretched mode in which the large number of labourers in this part were housed, determined to offer some examples of a better kind of home. The buildings are on two sides of a central road, with garden courts in front, and yards in rear, four on each side being in a row forming one block, and a pair on each side forming another detached block. Eight have three bed-rooms, and four have two of larger size, and each has a good living-room, a scullery, a ventilated pantry, a coal and tool place, water-closet, cistern with water laid on. Miss Brown requires certain rules to be observed by the occupants, such as that the payment of rent be punctual; that there be no lodgers; that broken windows be mended by her and charged to the tenant in addition to the rent; that the gardens be kept in clean order, &c., &c. The outlay has been about 2,400*l.*, and the rents are calculated to pay about 3 per cent. This is only one of a series of good works carried out by Miss Brown in this hamlet; for she made a gift of the land upon which an infants' school and teacher's house were erected, and subscribed also to the building fund. Subsequently she erected a large girls' school and house entirely at her own cost of above 1,200*l.*; and, moreover, the church accommodation being insufficient, she built two new aisles to the church, at a cost of nearly 2,800*l.* All these works have been executed under the directions of an architect, Mr. Edwin Nash, of London. The contractors were, for the church, Mr. James Hollidge; and for the other works, Mr. John Warne.

RAILWAY MATTERS.

ALTHOUGH a great many of the schemes about to be laid before Parliament are small in extent of line, not a few are of considerable importance, and may be characterized as the extension of rootlet feeders to the great trunk and branch lines,—extensions very essential to the final profit and success of these lines. Doubtless there is an undue amount of speculation, however; and, although we cannot call it a revival of anything like railway mania, still much evil may be in store for speculators ere the whole affair is settled. In 1845 there were 620 railway schemes afloat, involving a (hypothetical) expenditure of 560 millions sterling; besides 643 other schemes which had not gone further than issuing prospectuses. More that 500 of the schemes went through all the stages necessary for being brought before Parliament; and 272 of these became Acts of Parliament in 1846—to the ruin of thousands who had afterwards to find the money to fulfil the engagements into which they had so rashly entered. In the present instance there is nothing to be compared with this state of matters; but considering the lesson then and at other times taught it is rather surprising that speculators should have gone to even the extent now indicated.

As regards the metropolitan and other town extensions, junctions, &c., there is one point which ought to be impressed on Parliament for behoof of the inhabitants. On lines already in existence, the Great Northern for example, and within the limits of the metropolis, night is made perfectly hideous, and the repose of thousands is destroyed, by the crowding out and in, during the whole night, of all the worn out, wheezy, asthmatic, groaning, noisy screamers of engines, surely, in the company's possession, for the transit to and fro of goods traffic; and if a like system be extended to new lines without any restriction of such nuisances by Act of Parliament, the result must be something diabolical and horrible to think of. It is all very well for railway companies, to allow them to work out their worn-out engines for their own selfish interests in this way; but the interests and the comfort and quiet of the public, especially through the night, ought to be consulted before the interests of such companies. Besides, although the promotion of goods traffic by night may be unavoidable, surely night is not the time when worn-out and incapable engines should be trusted to keep time on railways.

The Charing-cross line, as we learn from the newspapers, has been formally opened, but only provisionally, the line being still in an unfinished state. When all expenses are paid, this line will be found to have cost very nearly, if not quite, 1,000*l.* sterling per yard! Much of this immense expenditure was due to the opposition of the Governors of St. Thomas's Hospital. Though called by the general name of the Charing-cross line, the extension really embraces two distinct schemes, viz., the line from Charing-cross to London Bridge, and the line from Charing-cross to Cannon-street. Yet, though legally distinct, they are practically one; and from the junction at the Borough Market, where the Cannon-street branch diverges across the Thames, both run on the same viaducts to Charing-cross. The line leaves London Bridge station by a rather sharp curve of little more than 500 feet radius. Two girder bridges of immense span and horrible ugliness take it over the approach to London Bridge. A viaduct on iron columns carries it through the Borough Market, and thence the line is continued, with scarcely any curves or inclines worth speaking of, through the poor neighbourhoods lying between the Borough and Blackfriars, across the Blackfriars-road, and parallel with Stamford-street to the Waterloo-road, where it makes a junction with the South-Western station, which it enters by a single line of rails, and so practically brings that large system of lines to Charing-cross and hereafter to Cannon-street. From this it continues in almost a straight line across the York-road and the Belvedere-road to what was once Hungerford Suspension Bridge, but which has now been converted, if not into the handsomest, at least into one of the most important railway bridges over the Thames. On this the line is taken over the site of Hungerford Market, which has been transformed into one of the most lofty and spacious stations yet built in the metropolis. When the Charing-cross line is completed, there will be a perpetual running to and fro of trains, which the *Engineer* graphically compares to the motion of shuttles in a steam-loom, all day long.

The traffic receipts of railways in the United Kingdom amounted, for the week ending the 21st of November, on 11,028 miles, to 565,760*l.*; and for the corresponding week of last year, on 10,578 miles, to 520,237*l.*; showing an increase of 450 miles, and of 45,523*l.* in the receipts.

It was mentioned two or three months back that the county of Donegal had gained the distinction of making the cheapest railway in the United Kingdom; the Finn Valley line, of 13 miles, having been constructed for less than 5,400*l.* per mile. The following, from the *Dublin Daily Express*, shows that the results are such as might have been anticipated, and that a good dividend may be realised from an amount of traffic that, under an extravagant system of construction and heavy payments for land, would have been ruinous to the shareholders:—"The weekly receipts of the Finn Valley Railway have risen from 39*l.* in September to 82*l.* last week. The inhabitants of the county of Donegal are at last beginning to taste the advantages of railway communication. Should this railway, as is usual, double the ordinary road traffic, the receipts would be about 200*l.* weekly, which would pay the shareholders above 10 per cent. When we are enabled to announce this, we shall look to see few districts in Ireland without a railway."

A railway has been seized by the sheriff. Mr. Death, sheriff's officer of Petworth, on the 23rd ult., took forcible possession of the Mid-Sussex and Midhurst Junction Railway, under an order from Chancery, at the suit of the Bishop of Oxford, for contempt of court, the railway company not having answered a bill filed by his lordship against them. A large staff of officials were forthwith placed over the whole railway, and all the men employed, amounting to upwards of 250, were stopped. On the 30th inst., we are informed, it can be sold if the matter is not settled.

DWELLINGS FOR THE WORKING CLASSES IN THE CITY OF LONDON.

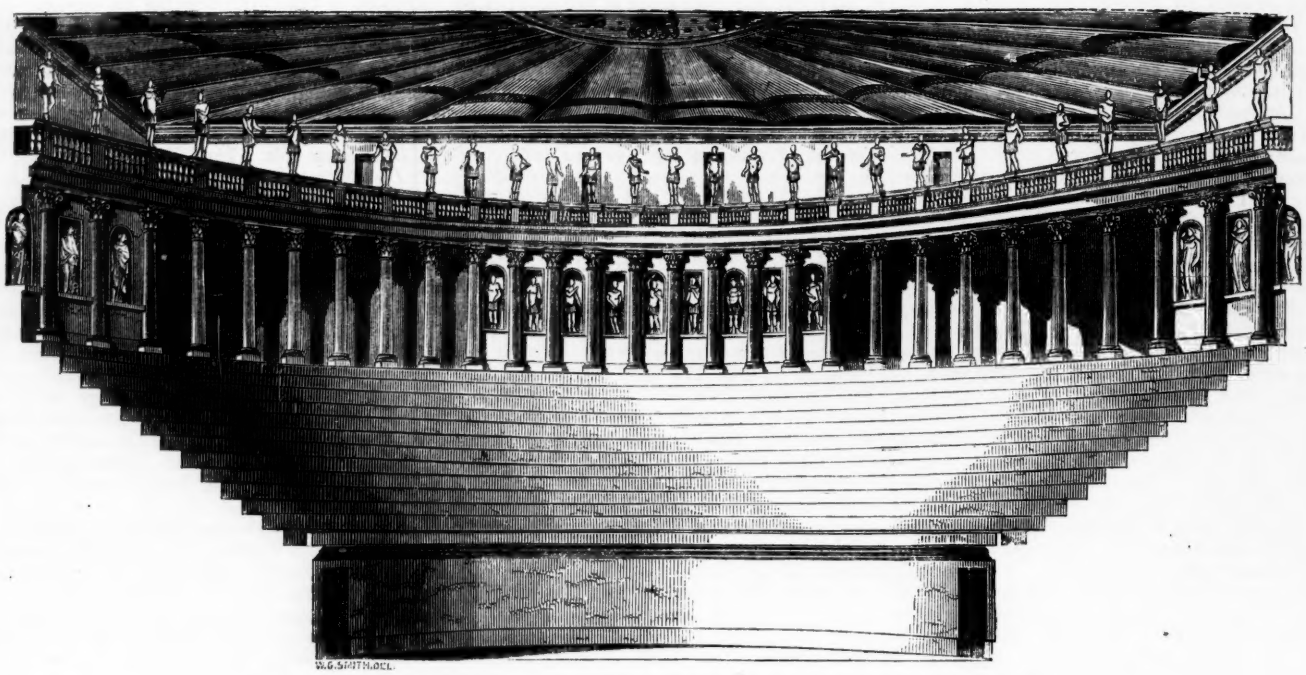
SOME efforts are being made at the present time, for the purpose of providing dwellings for the working classes in the neighbourhood of such localities as are affected by pulling down the tenements and other buildings in courts and alleys, and rebuilding on their site extensive manufactories and offices, adapted for the increased requirements of the metropolis. The united parishes of Saint Lawrence Jewry and Saint Mary Magdalen, Milk-street, with this object in view, and being the freeholders of a small piece of ground in Huggin-court, in the neighbourhood of Thames-street, upon which stood lately several ruinous and ill-contrived tenements, have pulled these down, and erected in their stead a building for the residence of the working classes, in which lighting and ventilation are better attended to.

The avenue has been widened, and the ground-floor contains two shops, with the entrance in the centre of the building, communicating with the apartments on the upper stories and the roof, upon which is placed a ventilating lantern. The apartments consist of three sets of sitting-rooms, with bedroom adjoining, on each side of the public stairs, forming accommodation either for three or six families, according to the number of rooms required; and the basement story is fitted up for laundry purposes. We are forced to express regret that only one bedroom goes with a sitting-room.

The parishes have invited the attention of such public companies as have taken an interest in providing accommodation for the working classes; and the Chief Commissioner of City Police has inspected the premises, with the view of adapting them for the families of the force who are obliged to reside in the City. Messrs. John Young & Son, of King-street, Cheapside, were the architects.

THE NEW STABLES AT MARLBOROUGH HOUSE.

THE building has the form of a block with two wings, and is constructed principally of bricks. In the centre of the block is the Royal entrance, leading into the garden skirting the Mall of St. James's Park, and communicating with the whole of the stables, coach-houses, harness-rooms, and offices of the structure. On either side of the Royal entrance are two coach-houses, each divided into three divisions, and each division capable of holding two carriages. The quadrangle in front of these coach-houses, together with the Royal entrance, is covered by an enormous skylight, supported by light iron columns, and open upon its three sides for the operations of inspecting and washing carriages, &c.; while the quadrangle



PALLADIO'S THEATRE, VICENZA. THE AUDITORIUM.

itself is lighted with gas, provided with clocks, manure-pits, water-tanks, and trapped drains. The stables include forty-five stalls and twelve loose boxes. All the fittings have been supplied by Mr. Barton, of Oxford-street, and are of iron, of a chocolate colour, excepting where the vitrified enamelled linings of the cornbin do duty for paint. The hay-racks are flat at the bottom, with open trellice-work, by which all dust is permitted to fall through. They are filled from time to time by hand, and all upper supply of fodder from lofts is entirely avoided. No projections or flanges are detectable anywhere, and the hayrack is provided with an "improved slip-back," to prevent the possibility of the horses' noses or heads getting fixed between the apertures. In the front of the corn-bin, hayrack, and water-tank, a "friction guard roller" is placed. The stalls are divided by boarding, surmounted by open ventilating "Exhibition pattern" iron railings, and are terminated by pillars, with stall rings and chains, which gather up and festoon. The handles of the loose boxes are all flush with the doors, and while at the command of the groom, are beyond the operations of the horse. The floors are paved with brick laid edgeways. Ventilation is supplied by open-work just beneath lofty ceilings. It being the general belief, that ophthalmia in horses has been aggravated, if not altogether induced, by the glare and refraction of white tiles and other glazed surfaces, the whole of the skirting opposed to the horses' vision is lined with Ravi-encioni marble of a bluish-grey colour, from the works of Messrs. Burke & Co., of Warwick House, Regent-street. In some of the stables are long rows of slate reservoirs for water, which, by closing, are converted into seats for the men. The builders were Messrs. Smith & Taylor, the successors of Messrs. Kelk; and Mr. Pennethorne was the architect.

SCHOOLS OF ART.

The Warrington School.—The annual examination by Mr. R. G. Wylde, H.M.'s Inspector of Schools of Art, of the works executed in this school, took place on the 24th ult., with gratifying results. No less than twenty-seven medals were awarded, and sixteen of the works were selected for National competition. One of the students (W. Jenkins) aged only fourteen years, the son of a gardener, has obtained five medals, one for each work executed, and two of them have been selected for National competition. The successful result of this examination must be gratifying both to the council of management and the master of the school, Mr. J. C. Thompson. The works were subsequently opened for public exhibition during the remaining four days of the week, when nearly 5,000 persons availed themselves of the opportunity.

The Gloucester School.—For four or five years this school has been unobtrusively at work, and no appeal has ever been made to the public for pecuniary help. Supported by a small but practical committee, and a liberal president (Mr. T. Gambier Parry), the art-master, Mr. Kemp, has laboured on, and the school is now self-supporting; still there remains a small debt incurred in the necessary adaptation of the premises in Longsmith-street to the purposes of the institution, and other unavoidable expenses connected with the founding of the institution; and in order to extinguish this, but still more to widen the interest felt in the school and to increase the number of pupils, it was determined to hold a public distribution of the Government prizes at the Corn Exchange, with an exhibition of drawings, &c.; Mr. Parry also reading a paper "On the Claims of Art upon an Age of Business."

MONUMENTAL.

The working-men of Leeds have determined to erect a statue to the late Sir P. Fairbairn as a public acknowledgment of the great services rendered by him to the borough.——A number of additions to the relics in the Burns Monument, Calton Hill, Edinburgh, has lately been made, and the museum promises shortly to become one of the most attractive exhibitions in Edinburgh. On the last visit of Mr. David Roberts, R.A., to his native city, he commissioned Mr. Ballantine to have the floor covered with kamptulicon of a design in harmony with the building, which has been done, and the expense, amounting to upwards of 10*l.*, defrayed by Mr. Roberts. Colonel William Burns, son of the poet, has forwarded the original model of the marble statue by Flaxman. The marble statue was completed after the death of the sculptor, and much of the character in the original model, according to the *Scotsman*, has been lost in the marble. An interesting document, presented by the poet's sons, is Burns's diploma as a member of the Royal Company of Archers, the Royal Body Guard for Scotland.——A monument to the Rev. Patrick Brewster has been erected in the cemetery at Paisley. The site chosen is at the upper end of the walk leading from the public entrance, where several roads branch off. The monument, which was erected by Mr. John Mossman of Glasgow, the sculptor of the bronze statues of Sir Robert Peel and Provost James Lumsden, in Glasgow, is made entirely of sandstone. The portions forming the pedestal are from the quarry which supplies the National Wallace Monument, and selected for its durability. The figure is of the celebrated Binny stone. Mr. Brewster is represented standing, as if about to address a public meeting. The pedestal in structure is Gothic. The designs of the mouldings at the base are all taken from the pillars of the Abbey Church. The height of the figure exceeds 7 feet, and, with the 9 feet of pedestal, makes in all nearly 17 feet.——The statue of William Dargan, according to *Saunders's Newsletter*, has been placed upon its pedestal on the lawn of the Royal Dublin Society, in front of the National Gallery of Ireland, at the west side of Merrion-square.——A monument is now being erected at Ajaccio, intended to commemorate, at the same time, the Buonaparte family, and the glory of the First Empire. The group is composed of five bronze statues, each 6 feet high, and representing Napoleon I. and his four brothers. The emperor is on horseback, in Roman costume, and behind him stand the others. The whole group will be placed on a pedestal of white marble, in the rear of which a triumphal arch with three openings is to be erected.

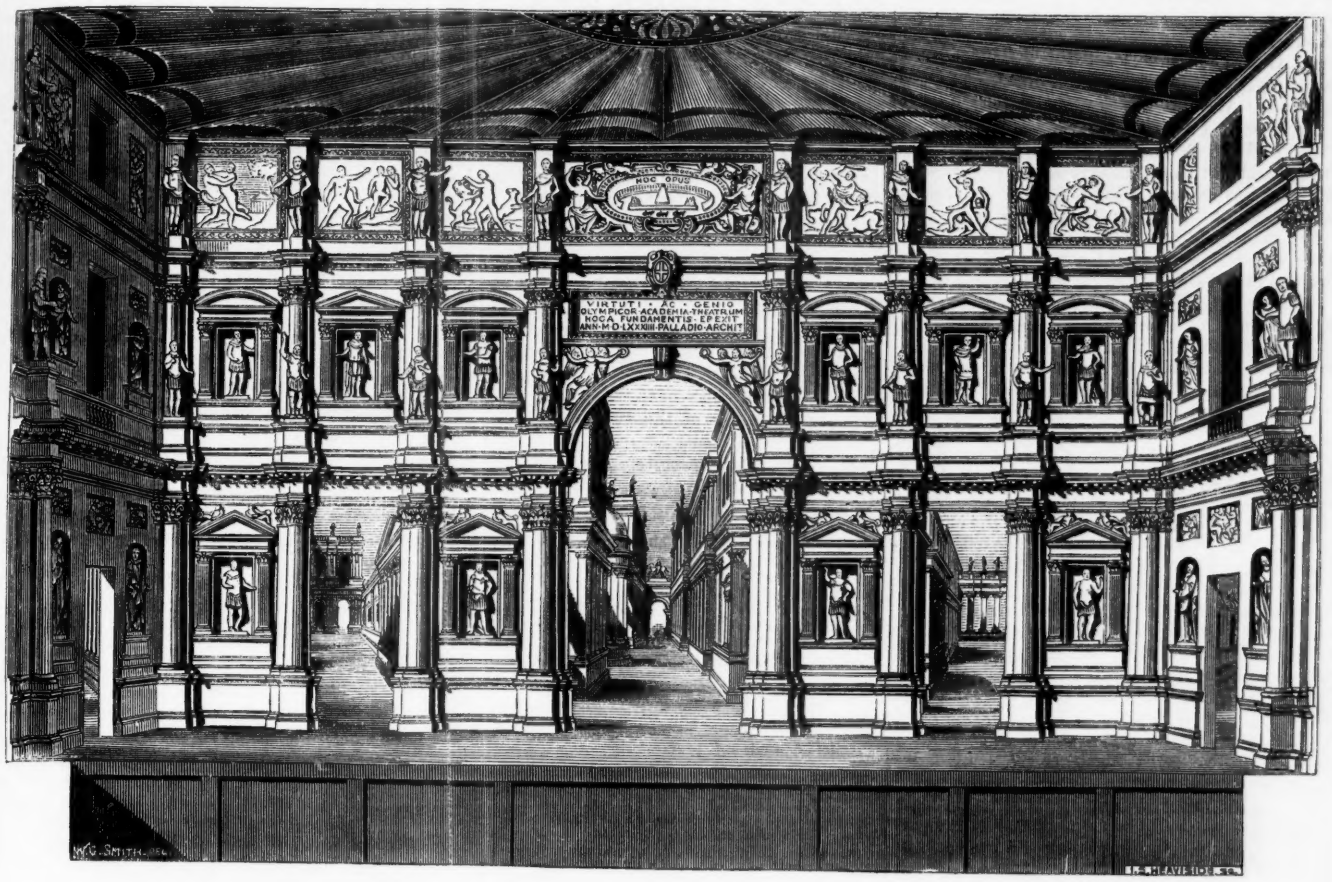
A GOOD EXAMPLE.

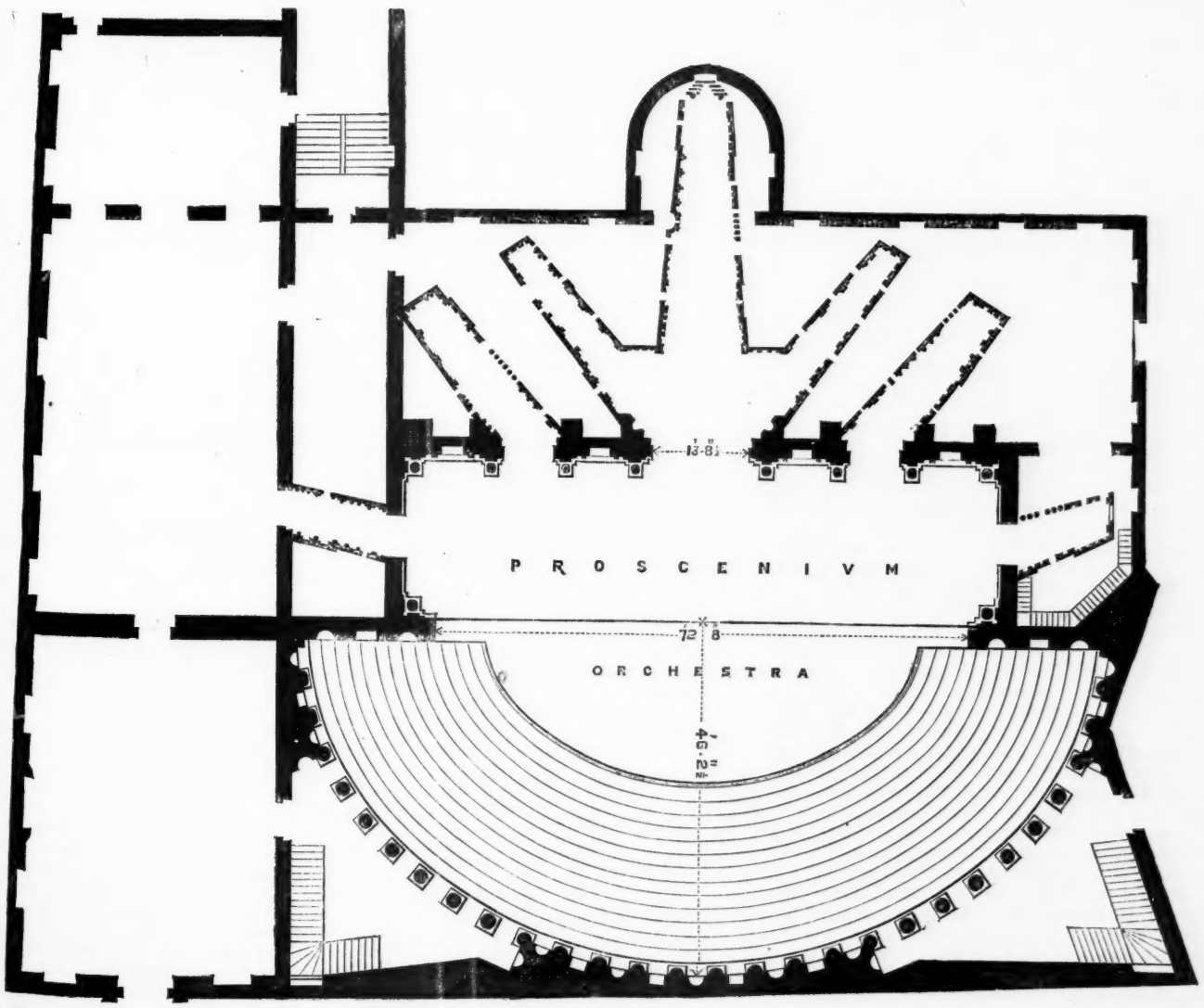
We are glad to find that a class for the instruction of artisans in geometrical, mechanical, and freehand drawing, has been established in connexion with the extensive works now in progress at Pilmore Hall, Croft, the seat of Mr. A. Backhouse, for which Mr. Waterhouse is the architect. Mr. Backhouse has in a liberal manner provided the workmen with drawing-boards, squares, &c. The class is under the direction of Mr. Hoskins, the clerk of the works.

CHICHESTER AND ITS CATHEDRAL.

The Rev. C. A. Swainson, canon residentiary, recently gave a lecture, at the Literary and Mechanics' Institute, on "Chichester and its Cathedral." The reverend lecturer commenced with some remarks on the condition of the country before the Roman times, when it appeared our predecessors in Sussex lived in wigwams very similar to those which are occupied by the Bechuanas now. He then spoke of the invasion of Claudius, drawing special attention to the fact that Chichester, as it now is, must have been planned and built whilst St. Paul was holding intercourse with Aquilla and Priscilla at Corinth. He then gave a sketch of Archdeacon Williams's proof that Claudia and Pudens, mentioned in 2 Timothy iv. 21, were "Chichester people,"—a statement which, he said, was possible and even not improbable; and so passing by the inroad of Ella and Cissa, and the advent of Wilfrid, the lecturer came to the removal of the Bishop's See from Selsey, "the Island of the Sea Calf" or Seal, as old Bede called it, to the city of Chichester. That Chichester was a city with its own mint, as early as A.D. 1000. He described the gradual rise of the cathedral, notwithstanding the serious injuries and disappointments caused by the great fires of 1115 and 1185, until, under successive bishops, it was beautified and weakened by the erection of a spire,

THE OLYMPIAN THEATRE, VICENZA. THE SCENE.—ANDREA PALLADIO, ARCHITECT, 1580.*





Plan.

[* See page 873, *ante*.

and the insertion of the great north and south windows. On these steps in its construction I need not tarry, because they are well known from the interesting memoir of Professor Willis, from which the lecturer said his information was taken. He passed on to later facts which, he observed, he had culled from the documents in the muniment-room. One of these was a curious memorandum of a visit paid about 1684 to the cathedral by Sir Christopher Wren. The great architect of St. Paul's is well known to have been no friend of the early ecclesiastical architecture of the country, and in this instance it was certainly well that his advice was not followed. It seems that the great north tower at the west end of the cathedral had "fallen down about fifty years earlier" (a fact which was hitherto unknown: it was believed that it was battered down at the siege of 1642), and the southern tower was very insecure. It was deemed hopeless to raise money to restore the fallen tower, and therefore Wren advised the chapter to pull down the other also, to shorten the cathedral by one bay, and then "to close all with a well-designed and fair-built west end and porch, which would make the west end of the church look much more handsome than ever it did, and would be done at half the charge." The lecturer said he had discovered that there was a large sale of timber on the chapter estates in 1797, for the repairs of the cathedral, "the great arch on the northern side of the quire being in a very dangerous condition;" that in 1736 the spire was partly taken down, for the communar was ordered to go on with its restoration until it was finished to the top; and that in 1813 contracts were again entered into to take down 11 feet of the spire and rebuild it. From the cathedral the lecturer passed to the clergy connected with it: the secular canons, who were transferred from Selsey, and who have lived in their canonical houses, in Canon-lane, from 1075 to the present year. He quoted the statutes of 1247 to show what the nature of these residences was, and the respective duties of dean, cantor, treasurer, and so on, according to the original constitution of the Church. They were called "canons," because they were bound to take their duties in the cathedral according to the "canon," or law, of the Church; and seculars because they lived almost in the world in their own houses, instead of under the roof of a monastery. Residentiaries, he observed, certainly were in existence in 1247, and he raised a smile by describing the forms that had to be gone through before a canon became completely a residentiary. He was bound for a year to attend every service at the cathedral, and if he ever failed he had to begin over again, and each day he was to dine at his own table the vicar of his stall, two other vicars of the church, the porter, two sacrists, and one chorister-boy: of course, this could not be maintained long, it was too expensive and irksome; and so he traced the clergy until he came to 1574, when the constitution of the cathedral as it is at present was fixed. But the greatest insight into the customs of antiquity was given by the statutes of the vicars choral, which were "codified" a few years before the Reformation. They received the old gilden hall of the city, the present girls' school, in the year 1394; here for more than a hundred years they met for dinner, &c. Here still remains the pulpit where the reader stood during part of the meal, reading the Bible, or some other holy book;—here the raised platform or dais, on which the high table was placed;—here the lavatory which was needed for their fingers, seeing they had no forks to carry their food to their mouths. The vicars ought all to be in their square before the curfew rang. When they went out of the close they were not to carry a sword, unless they were going into the country,—a curious illustration of those unsettled times. They were to keep no dogs within the precincts: they were to ask no one to dinner in their hall without giving notice to the cook; and all these rules were solemnly enacted, and the seals of the bishop, the dean and chapter, and the vicars themselves, were appended to the document. The reverend lecturer gave several other interesting anecdotes in relation to the cathedral manners and customs of olden times, and appeared thoroughly to interest and amuse a very large audience, among whom were the Lord Bishop of the diocese, the very rev. the Dean, and many of the clergy of the city and neighbourhood. F. W.

P.S. The restoration of the cathedral is going on remarkably well. The tower is now brought to a height of 85 feet above the level of the nave, so that it may fairly be anticipated that, ere long, we shall see a counterpart of the late beautiful spire,—a faithful portrait of a departed friend.

THE FALL OF HOUSE IN ISLINGTON.

The inquiry into the circumstances attending the death of the two men caused by the fall of the Wheatsheaf public-house, mentioned in our last, was continued before the coroner on Monday last, at the Ship, Camden-street, and six of the workmen were examined. Their evidence showed that the centre piers on the ground-floor, 14 inches square, carrying arches, and bressummers behind the arches, buckled and failed. *Two courses of brickwork had been left out in the piers for the purpose of allowing the doorsteps to be put in.* The arches were 4 inches thick in cement: there were four courses of 4-inch work in front of the bressummers, of course without bond. It had been observed about a week before the accident that the arches had bulged slightly. The centres had been struck. If we are correct in these points (the principal witness, Meldrum, prevaricated very much), the cause of the unfortunate occurrence is quite clear. The inquiry was adjourned until Monday next.

At the meeting of the Metropolitan Board of Works, on the 4th inst.,—

Mr. Vulliamy, superintending architect, made the following report respecting the fall:—

"From a careful examination of the facts I am decidedly of opinion that over-haste was employed, not only in building the walls, but also in following up the other works, which would necessarily cause a great jar upon the unset and green brickwork. The ends of the floor joists rested upon the front wall, and a great many men were at work on all parts of the building. I am unable to say with certainty what was the immediate cause of the fall, but I think it very probable that one or more of the piers under the bressummer either sank or buckled."

A letter received from Mr. Moseley, the district surveyor, contained the following statement:—

"The whole of the work was executed, so far as completed, to the best of my belief in full accordance with all the rules and provisions of the Building Act. I attribute the failure to the want of the due and sufficient settling of the mortar and cement, arising from the state of the atmosphere, the rapidity of the execution, the vibration of the scaffolding, or perhaps the whole combined."

Both documents were referred to the Building Act committee.

CHURCH-BUILDING NEWS.

Rye.—The restoration of the window at the east end of St. Clare's chancel of Rye Church, has been executed by Mr. Smith. A similar restoration is in progress of the window of the south-east chancel (now used as the National and Church Sunday School rooms), the space having for many years been filled up with plaster. To effect this renovation about 60*l.* are required, of which sum 35*l.* have already been subscribed.

Christchurch.—The Rev. Zachary Nash, according to the *Athenæum*, collected 3,000*l.*, and applied it to the restoration of the church of Christchurch. Still, little more has been accomplished than the arrest of the decay. Where restorations could be effected, these have been carried out by Mr. Ferrey. The great work, however, of restoring to something of its old splendour one of the most magnificent of churches, singularly poor in local resources, is one to be effected by the public at large.

Woolston.—St. Mark's Church, which has just been erected at Woolston, by Mr. Bull, of Southampton, builder, after designs by Mr. White, of London, has been consecrated by the Bishop of Winchester. It consists of a nave, with north aisle and transept, and chancel, the arches on the south side being temporarily bricked in, and at present forming an arcade, in order to add a south aisle as soon as the funds will permit of this being done. The clerestory is lighted by three or four windows on each side, containing four lights, divided by mullions, with pierced headings. The roof is open, and the woodwork is intended to be stained when funds are in hand. The stone employed for the main body of the building is Swanage, the dressings being of Corsham Down. The inner walls and arches are faced with bricks of various tints, arranged in regular order, with a variety of patterns and bands, the pillars and capitals being of Bath and Tisbury stone. The capitals are not carved, but are left in such a state as to allow of this being done at some future period. In the chancel, the arches which separate it from the narrow chancel aisle are supported by single shafts of polished Devonshire marble. The entrance to the church is on the northern side at the western end, by a doorway beside the base of the unfinished tower. There is a temporary turret for the bell already hung. The sittings are in varnished open deal benches, and number about 300, some of which are free.

St. Helen's.—The church of St. Helen's has been re-opened by the Bishop of Worcester, after the insertion of a new east window and other works of restoration. The new window, which is of the Geometrical Decorated style, and consists of five lights with trefoil heads, and tracery above, has at present stained glass only in the tracery, though it is in contemplation also to fill up the five lights as soon as sufficient funds can be raised. The design and execution of the window were by Mr. Preedy, London, architect, as we have before stated. The work is a memorial to the late rector, the Rev. J. H. Wilding. In the centre at the head of the tracery is a circle, having twelve foliations or cuspings, and the subject of the design is the Ascension. On either side, lower down, are two smaller circles, with eight cuspings, each circle containing an angel, one with a harp and the other an organ. The architect named has also sent a design for a reredos, which has been approved of by the bishop, and will shortly be erected. The Nash monument on the north side of the communion table has been cleaned, painted, and restored, at the cost of Dr. Nash, by Mr. Stephens, sculptor.

Bath.—A vestry meeting has been held in the Abbey Church for the purpose of considering the specifications received from Mr. Scott of sundry necessary repairs to be done to the outside of the church. It was stated that Mr. Scott's estimate for the whole of the internal arrangements was 12,000*l.* If a stone roof were put up in the nave, to correspond with that in the choir, it was calculated that it would amount to 3,000*l.* out of the 12,000*l.*, and that the repair of the windows would cost about 2,300*l.*; but the present specifications did not take in the whole of the windows. A large portion of those not referred to were in a bad state, and to them something must be done. An estimate had also been made by Mr. Hill for re-erecting and improving the organ "so as to make it one of the finest ecclesiastical organs in the kingdom," for 1,200*l.* It was arranged that a committee should be formed as soon as the tenders for the work were received from the architect.

Rigsby (*Alford*).—The church at Rigsby, which was one of the oldest in this country, dating from before the Norman Conquest, being in a most dilapidated and dangerous state, was taken down in the early part of the present year. Sufficient funds were nearly collected to build a new church. This has been done under the directions of Mr. Fowler, of Louth, architect. The new church is built in the Norman style, of Ancaster stone, the outside being faced with white brick, ornamented by red brick. It has a circular window in the west front, filled with stained glass, the gift of Lady Mary Nisbet Hamilton: the three lancet windows in the apse are also filled with stained-glass memorial windows, the gift of Mr. Higgins. Another memorial window, the gift of Dr. West, is being prepared. The church will hold about 120 persons. The benches are of stained deal, and the pulpit is of Caen stone.

Fovant.—The parish church of Fovant has undergone complete renovation, principally by the assistance of the trustees of the Pembroke Estate, and is now re-opened. The church has been restored as nearly as possible according to the original design. As much of the old walls as possible has been preserved, but the roofs of the nave and chancel, which are waggon-headed in form, are new. During the progress of the restoration, considerable portions of Norman work were discovered, showing that a highly-decorated church in this Early style once occupied the site of the present edifice. Among these remains a Norman doorway was found in the south wall, so near to its present position that Mr. Wyatt, the architect, felt justified in using it as the entrance to the chancel aisle. The east window, which is of three lights, is in the Decorated style, and is filled with stained glass, by O'Connor, the design being copied from a picture by Guido, representing the Crucifixion in the centre compartment, with the Virgin Mary and St. John on either side, with angels above in the tracery. At the base of the window is a brass containing the following inscription:—"To the glory of God, and in memory of Sydney Lord Herbert, this window is erected by his widow." In a single-light window on the north side of the chancel is a figure of St. George, the patron of the church; and a little further westward, on the same side, is a two-light window, representing in one compartment the Saviour knocking at the door; with the words, "Behold, I stand at the door and knock;" and in the other compartment as the Good Shepherd, with a lamb in his arms. These two windows are also the gift of Lady Herbert, and are the work of Messrs.

Lavers & Barraud. The west window, which is of Perpendicular character, is of four lights. It is filled with stained glass representing the four Evangelists, in life size; and is the gift of the parishioners, "in memory of their friend and neighbour, Lord Herbert." The carving of the pulpit and of the rest of the work in the church is by Mr. S. Sansom, of London. The seats of the church are open, and are of stained deal, and varnished, all the doors of the edifice being of oak.

St. David's (Pembrokeshire).—In consequence of the dangerous condition of St. David's cathedral, as already noticed, it has been inspected by Mr. Scott, who has prepared a report in which he estimates the cost of its restoration at 30,000*l.* This report has just been laid before the public meeting of inhabitants of Carmarthenshire, announced to be held at Carmarthen. The bishop of the diocese presided. Lord Dynevor moved the first resolution:—"That the state of the Cathedral of St. David's, as described in Mr. Scott's report, renders it desirable that steps should be immediately taken with a view to its repair and restoration." His lordship pointed out that a portion of the tower of the cathedral, which was 700 years old, was crushed, and was only supported or "bolstered up" by the wall which abutted against it; two of the four supports of the tower being wholly untrustworthy. He thought that they might confine their yearly expenditure to 3,000*l.* or 4,000*l.*, and so extend the subscriptions over a number of years, the subscribers paying them by instalments. This resolution having been seconded by Mr. Pugh, M.P., Mr. Scourfield moved:—"That the portion of the work to be undertaken in the first instance include the repairs of the tower, and parts immediately in connexion with it, and the restoration of the choir or eastern arm of the cathedral." This resolution having been carried, Colonel Sir J. J. Hamilton suggested the erection of a new cathedral in a more central position in the diocese. He would contribute 100*l.* towards the restoration of the cathedral as a parish church, and for the erection of a new cathedral in Carmarthen he was prepared to do a great deal more. Mr. Scott then addressed the meeting, explaining the state of the cathedral, which, he said, was at present not only in a dangerous, but a disgraceful condition. The tower was imminently dangerous. A committee was then appointed, including the bishop, the dean and chapter, and the archdeacon of the diocess, the members for the counties and boroughs, Earl Cawdor, Lord Dynevor, Mr. Beresford Hope, M.P., and other gentlemen. Some large subscriptions were announced, including 1,000*l.* each from the bishop and the dean and chapter, 500*l.* from Lord Dynevor, 300*l.* from the Rev. Sir Erasmus Williams, in addition to 200*l.* included in the dean and chapter's donation.

Liverpool.—The church erected at Tunnel-road, Edge-hill, and dedicated to St. Catherine, has been consecrated by the Bishop of Chester. The building is in the Early English style of architecture, built of brick, with Stourton stone facings, and erected on land belonging to the trustees of the late Mr. Thomas Earle. The late Lieut.-Colonel Adam S. Gladstone contributed 1,000*l.*, and the late Mr. William Gregson subscribed 200*l.* The building will accommodate 890, the seats in the gallery being free. Mr. J. D. Gee was the architect; and Messrs. Nicholson & Ayr were the contractors. The building was erected at a cost of 3,000*l.*

STAINED GLASS.

St. Mary's, Hulme.—Two more lights of the great east window of this church have been filled with stained glass, by Hardman, of Birmingham. The subjects are "The Baptism of our Lord," "Angels Ministering to Him after the Temptation," "The Marriage at Cana," "The Agony at Gethsemane," "Christ bearing the Cross," and "The Crucifixion." These form part of a series of eighteen subjects, all taken from the life of our Lord, which will fill the six lights of the window; the tracery being filled with the "evangelistic symbols," angels, emblems, and other devices. Four of the lights are now filled. The size of the window is 48 feet and 25 feet. The cost of the whole will not be less than 1,000*l.*, which has been undertaken by one member of the congregation.

Sedgefield Church.—A large number of the clergy of the diocese, including the bishop, have got one of the windows filled with stained glass in the north aisle of this church, as a memorial of affectionate respect and esteem for the Rev. T. L. Strong, the rector. The subjects chosen for illustration are "The Administration of Baptism" and "The Lord's Supper;" the lower part of the lights in the window beneath the chief subjects being filled in with "The Baptism of Cornelius" and "The Institution of the Passover." Messrs. Lavers & Barraud, of London, executed the work, under the direction of the Revs. Messrs. Park & Ford.

Sowerby Church, near Thirsk.—This church has been lately embellished by the insertion of three stained-glass memorial windows. One, consisting of two lights, is placed on the north side of the nave, opposite the south door of entrance, and forms a couplet. Each light contains a Scripture subject; that on the left representing "The Annunciation of the Virgin Mary;" the other, on the right, "The Saviour appearing to Mary Magdalene in the Garden, after his Resurrection." Above these, as well as below, occurs scroll work. Ornamental borders run round and enclose the whole. Another memorial window, of one light, is placed in the angle of the south transept, where it joins upon the nave, and is altogether of a different cast. It is geometrical in character, and surrounded by a border. The subject represented upon it is "The Woman touching the Hem of the Saviour's Garment;" above and below which is a medallion, enclosing a cross *pattée*. These windows have been erected by Mrs. George Holmes, in memory of relatives. The third memorial window, also of one light, is placed at the angle of the north transept, and is similar in character and design to the corresponding window in the south transept. The subject represented is "The Saviour as the good Shepherd;" having likewise, above and below, and enclosing, a cross *pattée*. This window was erected by subscription, as a tribute of respect to the memory of a churchwarden of the parish of Sowerby. The windows are of the Norman style of architecture; and the artists were Messrs. Warrington & Sons, of London, who also executed the triplet recently erected at the end of the north transept of this church, to the memory of several members of the Cayley family.

Old Church, Ayr.—Another memorial window has just been erected in this church, to the memory of the late Mr. John Boswell, of Garallan, by his fellow townsmen. The subjects in the twin lancet-lights of the window are, "Our Saviour weeping at the Tomb of Lazarus," and "Our Saviour raising Lazarus from the Dead." The work was done by Messrs. James Ballantine & Son, of Edinburgh. The colouring and ornamentation are in harmony with the other windows recently erected in the church by the same artists.

British Church, Riga.—By an accidental transposition of the printer, the large east window of this church, which was executed by Messrs. James Ballantine & Son, of Edinburgh, is made to appear as if it had been the work of other artists previously named.

THE METROPOLITAN SEWAGE QUESTION.

THE Metropolitan Board of Works have resolved,—

"That, inasmuch as the Board are bound by various provisions of the several enactments under which their works are carried on so to conduct them as not to cause a nuisance, and that the profitable employment of sewage under the schemes proposed in the tender may involve its application to the surface of the land on an extensive scale, they cannot be parties to any agreement for such application unless they have clear information on the localities, nature, and extent of the land to be so dealt with, and satisfactory assurance that the processes to be employed are such as not to cause a nuisance; that none of the tenders received being sufficiently clear upon this point, the Board therefore refer them generally to the Main Drainage Committee, in order to obtain essential and detailed information; and to confer with the several promoters as to other conditions of the advertisements upon which their proposals are neither full nor explicit, and generally to consider as to the utilisation of the sewage."

The vestry of St. James's, Westminster, at a special meeting, also to consider the tenders, resolved to urge their representative at the Board to oppose the granting of any concession until further opportunity for inquiring into the plan of Mr. Ellis has been afforded.

Meantime this gentleman is still busy propagating his ideas through the press, and has issued through Ward, of Bartholomew Close, publisher, a new pamphlet on the subject, titled "The Sewage of the Metropolis, and how to utilise it."

Mr. James Edmeston, architect, has also published a pamphlet, titled "How can the Town Sewage be best preserved and utilised," in which he urges an adaptation of the Paris system to London; but with the best will to consider any proposition of Mr. Edmeston's, we cannot listen for a moment to the adoption of any modification of the night-stool system here: its unwholesome and offensive results in Paris afford precisely one of the strongest arguments against it in our opinion.

THE PROPOSED SCHEME FOR RAISING HOLBORN VALLEY.*

SIR,—The Corporation plan for raising Holborn valley is now before the public. Its chief merit,—if a merit it be,—consists in separating the two great lines of traffic from each other, the Holborn line being raised 25 feet.

Now, Sir, permit me to ask what would the public say to any scheme that proposed raising the New-road where it passes Tottenham and the Hampstead roads 25 feet, or to the raising Oxford-street at the Circus, the same height above Regent-street, obliging all traffickers to find their way round, up easy ascents, to the higher level? I would not be the person to propose such a scheme. The plan places a viaduct bridge over the valley at the Holborn end, allowing 21 feet headway: it raises the valley beneath 6 feet. Not one of its hills is made level. Farringdon Market is shut out completely from Holborn; but considerable attention has been given to the formation of approaches to the new Meat and Poultry Market. Now, in the words of an old song,

> "It is well to be honest and true,
> And it is well to be off with an old love
> Before you are on with the new."

Farringdon Market is placed upon a steep hill: two of its three sides are closed, from the difficulty of access. Its return of profit last year to the Corporation was 40*l.*

> Now is it either honest or true
> To knock an old market down
> As soon as you think of a new?

To carry out the Corporation scheme, no less a number than 646 houses are required to be removed. If these are all to be purchased and paid for at the same rate as those obtained by the London, Chatham, and Dover Railway Company, in their passage through the City, over five million sterling will be required, and this before a pound is laid out in reconstructing the roads. The plan is as objectionable as any that has been made for the purpose during the last forty years. It is on the old and fallacious principle that the valley should be attacked at one of its cross sections, instead of at its main centre line, and success, therefore, is impossible.

By raising the valley from north to south, all the hills are levelled, the market is rendered easy of access, and the Holborn end made another Regent's-circus. It can be done without removing a single householder, and at an expense of less than half a million: side streets to both old and new markets can easily be formed; and the plan, moreover, would return interest for the money expended.

C. J. RICHARDSON.

CONSTRUCTION OF TEMPORARY BRIDGES.

IN a recent impression of the *Builder* you gave an account of a suspension-bridge lately put up by the Royal Engineers at Chatham: allow me to give you a description of one erected by the Volunteer Engineers whom I have the honour to command. The bridge was put up in the month of June, on the occasion of a field-day at Torquay. The spot selected was a chasm between the mainland and a detached headland or rock, distant 65 feet. Sergeant-Major (R.E.) John Jones's iron gabion bands were used as the supports; but as the materials supplied by the Government were limited, viz., only 200 bands, without any superstructure, the *gabion pickets*, interwoven with the bands, as used in the construction of gabions, were adopted to form the platform of the bridge; and, for infantry purposes on a small scale, will be found very efficacious, and possessing this advantage, that nothing but the gabion-bands need be taken to encumber the troops. A sufficient number of gabion bands to construct a bridge of 50 feet span may be stowed in a space of *four cubic feet*.

The bridge consisted of ten lines of gabion bands alternately double and single: each band was united to the adjoining one with the slot and button on the bands themselves, but for additional security I had the double bands fastened with the

* We print the following from one who has given some attention to the subject, with the view of aiding in the ventilation of a question of enormous magnitude, and not with any desire to throw obstacles in the way of the Corporation's proceedings.

small nuts and screws used for fastening eaves gutters. The end bands formed loops, which were passed over straining pieces, and with blocks and tackle were strained and secured to two posts at each end, firmly driven into the ground in a raking position. This bridge was twice erected by about twenty volunteer engineers in two hours, and was used by them and the public for approach to the rock for several weeks with as many as twelve persons at a time upon it without the least sign of weakness being apparent. The bridge was constructed exactly similar to a *gabion*, being 2 feet 9 inches wide, and a continuous piece of *basket* work. With the exception of the gabion bands and straining tackle, the materials for a bridge of this description may be generally obtained in the field.

EDWARD APPLETON, F.I.B.A.
Officer commanding 1st Devon Volunteer Engineers.

HOW SHALL WE BUILD OUR CHURCHES?

SOME time in 1851 I addressed, through your columns, a challenge to the late Mr. Welby Pugin, to meet me before the Institute of British Architects, and discuss, *vivâ voce*, the points in dispute between Protestants and Papists relative to the arrangements of their respective churches. Mr. Pugin replied, through the same medium, declining my challenge, but stating, that his forthcoming work on "Chancel Screens" would contain a refutation of my views.

On turning to page 22 of his book, under the head, "On Screens in Italy and Spain," I found the following passage:—

"I commence with Italy, first, because it has been the fountain from whence Catholic truth has flowed to other parts of Christendom; and secondly, as I believe it is a very general delusion that screens formed no part of the fittings of a Roman church.

As an overwhelming contradiction to this often-repeated error, I produce a representation of the great screen in old St. Peter's, from the most irrefragible authority, from which it will be seen, that a *double* marble wall was erected, about 6 feet high and 12 feet apart; that on these walls stood twelve porphyry pillars, supporting a transverse cornice, surmounted with standards for lights. Moreover, at the necks of these pillars, under the caps, rods were extended, for the suspension of lamps, which were kept perpetually burning, in honour of the apostles, whose *relics* lay beneath the high altar.

The altar, as will be seen by the plan, stood considerably within the screen, surrounded by pillars, and covered by a ciborium. The back of the altar is turned towards the nave, with a cross and candlesticks upon it, and must have completely concealed the celebrant from the people: behind all this is seen the great apse, with the cathedra for the pope, mosaic ceiling, and usual decorations.

This is the most important authority for the use of screens in the ancient Roman Church; and the dignity and sanctity of the old basilica of St. Peter was so great, that it would be naturally considered as the type for other churches. Moreover, if we except the details which belong to the early period of its erection, it is a perfect type of a pointed screen,—convert the twelve pillars into shafts, surmount them with arches, and terminate them by a bratishing, and we have a work of the Mediæval period."

Mr. Pugin's plates, in illustration of this passage, show the original chancel with the simple old *stone seats*, at its extreme end, and a modern screened affair in front, shutting out the old seats from sight and use.

Again addressing Mr. Pugin in the *Builder*, I pointed out that the youngest clerk in his office ought to be aware that the *style* of the pretended old screen fixed the date of its erection in the fifteenth century; and that he, Mr. Pugin, knew this quite as well as I did, and therefore must accept my congratulations on "belonging to a 'church' which would give him absolution for committing such a bare-faced literary fraud in her honour."

Repeatedly since then, in letters, which have been copied and re-copied, and have thus traversed the kingdom, I have re-stated the facts I have discovered in relation to the old churches, and challenge denial of any one of them.

The Rev. Mr. Purton, in your paper, at last steps into the ring, picks up my glove, and proclaims his defiance to my assertion that "the original place for the 'Lord's table' was in the middle of the church."

Unfortunately for Mr. Purton, he has ventured to bring forward a writer of the fourth century to back his own assertion; and Eusebius, in Mr. Purton's hands, is made to speak exactly the contrary to what he really wrote.

To do my opponent justice, I must quote his own words:—

"The earliest detailed description we have of a Christian temple is given by Eusebius in Book X., chap. 4, of his 'Ecclesiastical History,' written A.D. 325; in which he gives an account of the new church at Tyre, consecrated A.D. 306. After speaking of the atrium, with its cloisters, the baptistery, porticoes, vestibule, and nave, he comes to the bema. This, he says, 'he' (the founder) 'adorned with lofty thrones in honour of those who preside; and also seats, decently arranged throughout' (*i.e.* all round) 'the whole, and at last placed *the holy altar* in the middle. And *that this again might be inaccessible to the multitude, he enclosed it with frame lattice-work, accurately wrought with ingenious sculpture, presenting an admirable sight to the beholders.*" "Here," continues Mr. Purton, "we have express mention of the holy altar standing 'in the middle' of the apse, shut out and made 'inaccessible' from the nave by the 'cancelli.'"

Now, then, let us hear Eusebius himself: "Furthermore, when he had thus finished the Temple, and adorned it with thrones, which he erected in the highest or chiefest place, in honour of the presidents, and also with lower seats, placed in decent order *all over the Temple*. He at last placed the holy of holies, to wit, the altar, *in the middle*, which he made every way inaccessible to the multitude by a separation of network of wood, wrought and carved with such accurate skill and art as makes as wonderful a spectacle as eyes can behold."

It will be observed that Eusebius, first mentioning the "presidents'" seats, which invariably stood at the extreme end of the church, then proceeds to describe the seats for the congregation all over the Temple, and at last the altar "in the *middle*."

By dexterously substituting "bema" for "temple," Mr. Purton converts an authority, which fully establishes my statement, into one diametrically opposed to it.

It is true that Eusebius uses the terms "altar" and "temple," and that other writers of the period do so also. Chrysostom taxes the Christians of his day with being more than half Jews in their opinion, and a fierce controversy prevailed as to whether Christian rites and ceremonies had their origin in "temple" or "synagogue" models; the archbishop in question taking the latter view. It is quite clear that such a dispute arose from the efforts, first, of individual bishops, and alternately of the whole order, to change their original position of officers in a community of "brethren" and equals, into that of lords and masters.

Every type and symbol referred to by the Apostles, and every word used by them in its direct application, conveyed the assurance that the Christian community was a royal company of "kings and priests," and that thus, as Ireneus subsequently assures them, every man was of the "sacerdotal order." There is not even the shadow of a doubt that the model selected, and so universally used, was chosen because it illustrated and accommodated the ideal of a free and equal assemblage.

There is a certain sense of "fitness of things," which produces like results in all ages and countries. Thus all "temples" have this one arrangement in common, that they are places designed exclusively for the reception of a "caste," and illustrate the idea that the people could only address the object of their worship through the intervention of priests. On the other hand, a free people invariably design open halls, with nothing in them to indicate or accommodate a "caste."

If the primitive Christians had not found such a model in the Roman basilica ready to their hands, they would assuredly have originated one exactly similar.

There cannot be a more striking illustration of the force of this universal principle, than the fact that the "Knights Templars," who claimed to be all "priests," in the church they designed for their own use, laid aside the Mediæval model, and built a simple hall. The Temple Church in London is thus purely primitive and Protestant in its principle of arrangement.

All the writers on church antiquities I have met with fall alike into the error of mixing up, in one description, arrangements and names, of different dates, and due to two totally opposite principles of arrangement.

The ludicrous incongruity of using "holy of holies" and "chancel platform;" "temple" and "conventus," or "meeting hall;" "table" and "altar," as synonomous terms never seems to have struck them; and thus the sight of a genuine old church, stripped of its modern additions, creates as much astonishment in a certain class, as Lord Dundreary experienced when the whole article was brought to his notice—"Oh! that's a cucumber, is it? Well, I always thought they grew in slices."

The passage of Eusebius I have quoted, taken in connexion with the existing state of the Constantine churches, explains the whole mystery which had long puzzled me, both as an architect and a student of Christianity.

I could easily bring forward a chain of proof, that the Christian system demanded a "table" in the midst of the people. Eusebius proves that in his day this custom still existed, and he designates the table or "altar," as he chooses to call it, the "Holy of Holies." It is immaterial to the argument at what precise period this "table" was moved from its time-honoured position, among the people, on to the minister's platform: it is indisputable that no "chancel" in any church previous to the tenth century was ever designed for any other use than that of giving raised seats to the presiding officers; and that wherever such a spot was made to accommodate the "table," it was by subsequent enlargement; and then the "table," or stone tomb, as it often became after the fourth century, took with it the exaggerated terms of sanctity rhetorically applied to it.

When taunted by their Pagan neighbours with having no "altar," the Primitive Christians candidly admitted the impeachment, in the well-known words—"Altars and shrines have we none."

They knew well that the "spiritual sacrifices" they offered up required a "spiritual altar,"—"CHRIST." There was an exact parallelism between the symbols last referred to and those gathered from the "Temple." Thus "the Father," the Great Architect of the universe, provides the site,—the "Son of God" the "rock,"—on which, in His earthly nature the son of a builder, he builds Himself up into a perfect "Temple;" starting the work of the great aggregate spiritual "Temple" as the first individual perfect living "Temple," the "chief corner-stone," with "the apostles and prophets" as "foundation-stones," ON which each successive stone was to be laid. The apostles, as the first successful "master builders," were permitted to draw up the rules by which the future "stones" were to be squared; and every future "stone" was to be bound or bonded in to the "walls of salvation," if fulfilling the conditions of the apostolical specifications, and using as materials the "gold and silver" of God's words, and not the "hay and straw" rubbish of rascally "contractors" offering to do the job on cheaper terms.

If laid within the "lines of judgment," and bearing the test of the "plummet righteousness," every successive stone was also in itself a perfect living "Temple,"—Christ its "rock," its pattern, its "altar," its "door;" faith and repentance being the "keys" of admission into the outer "sanctuary," the Church on earth; and "His flesh" its "veil," through which, at last, entrance is to be given into the presence of the real "Holy of Holies,"—"God." Of such a "Temple" who can be the "priest," save Him who builds *Himself* up into a "Holy Temple to the Lord"?

The question in dispute is clearly one in which the opinion of architects is valuable, because it is utterly impossible for any honest man, familiar with antiquities, and aware therefore of the indelible nature of religious customs, not to see that a people trained in temple rites and customs would as soon have thought of stripping the skin from their bodies as of changing a model arranged solely for sarcerdotal priests and a material sacrifice, for an open hall, with the table, or "Holy of Holies," as Eusebius calls it, in the *midst of the people*.

It is clearly for the advocates of the materialisation of Christian spritual things to account for the interregnum, however short it might be, between the old use of "temples" and the conversion, during the Middle Ages, of "chancels" into "temples," added on to a "meeting hall." At all events they have got this FACT to dispose of, that every single thing, in any church before the tenth century, which now appears to favour their views, came to it as an addition of comparatively late date.

That a rite indicative of the kingly dignity of those sharing in it was converted into a symbol of "bondage," and that those who were at one period the "elder brethren" of the people, became in time the "lords over God's heritage," is an historical fact, as true as that one, even of the Apostles, betrayed his Master with a kiss.

Mr. Purton is not content with being wrong in one instance: nothing short of total error will content him. It is not true that only in the "adapted basilicas," the orientation principle was avoided: there is, I believe, no single instance of a church erected by the early Christians standing east and west, without the entrance being at the east end, the chancel at the west.

It is certainly amusing to see Mr. Purton

arguing, all through his letter, that no change had occurred between a Mediæval chancel and an ancient one; and then stating that it is an "insult" to your readers to imagine that the Church of England, in directing that the chancels "should be as in times past," meant the old chancels. Does Mr. Purton know or forget that the Church of England condemns as "idolatrous and blasphemous" those doctrines of Rome which originated the Mediæval (so called) "chancels," and then passed an equally strong judgment on them, and not merely in words, but by deeds also deprived them of their chief distinctive features, ordering all "screens" to be taken down, all "altars" to be destroyed, and the "table," when required for use, to be brought out of the "chancel" into the "nave"?

I leave it to your readers to decide who it is that has not only insulted their common sense, but their common honesty.

JOHN ELLIOTT.

ARCHITECTURAL LIBRARIES.

"ARCHITECTUS" has drawn attention, through your columns, to the excellent collection of books in the South Kensington Museum.

May I be allowed to point out another very valuable, and perhaps more accessible, collection, which includes a large number of architectural works, but is far less known and used than it deserves. I allude to the library of the Commissioners of Patents.

This library is in the heart of London, in Southampton-buildings, Chancery-lane; and it is entirely free, any person having liberty to consult it on entering his name in a book. Besides standard volumes, nearly if not quite all the architectural and engineering periodicals published in England and on the Continent are to be found there; and a most attentive and efficient staff of assistants will afford the reader every facility he can require.

It is also not, I believe, generally known that the splendid collection of maps belonging to the Royal Geographical Society, in Whitehall-place, is open to the use of all applicants without fee or introduction: such was, and I believe still is, the case.

VULCAN.

ARTISTIC NATURAL THEOLOGY.

SIR,—The subject of what your correspondent "X" terms "Artistic Natural Theology," has not been so neglected as he thinks. The paper read by Mr. Cave Thomas at the Antwerp Congress grasps this subject, and the views it contained were deemed of sufficient importance to obtain for it the distinction of being printed in two languages in the *Compte Rendu* of the Congress, and at full length in the *Builder*. This paper was necessarily but a brief sketch of those views which have since been published *in extenso* by Ellis of King-street, Covent Garden, under the title of "The Holiness of Beauty and the Conformation of the Material by the Spiritual," reviewed in your columns, and those of other leading journals.

Mr. Thomas's book deserves to be read, and I commend it to the notice of those who may be interested in the subject of your correspondent "X.'s" letter of last week. I hear of a work entitled "Formative Ethics," as "preparing for the press," by the same author, and which, I imagine, bears upon the same subject.

DELTA.

BLIND LOCAL BOARDS.

SIR,—You have shown up the doings of "blind builders;" now, I think there are others in the dark as well as some builders are, as the following will show: it is copied from the *Oxford Journal*, of the 28th ult.:—

"*Witney.—Local Board.*—Mr. THOMAS ANDREWS, *baker*, of this town, has been appointed by the Board their Surveyor and Collector."

Whatever shall we hear of next? Surely there is a wide difference between bread-making and road-making, without saying anything about many other duties requiring the attention of a surveyor to a local board, if carried out efficiently.

EVERY ONE TO HIS OWN TRADE.

INSULT TO THE PROFESSION.*

SIR,—The surveyor to the Board of Health at Ely has very wisely obtained a better situation, and resigned his old berth, where he has had no sinecure. The nature and amount of the work required from that officer is detailed in the advertisement in your journal of last week; whence it may be learned, that the district comprises 17,000 acres, 1,600 houses, and 14¾ miles of highways, and that the happy man, who, basking in the smiles of the Board, may be favoured with the appointment, is to hold three offices rolled into one; viz., "Surveyor," "Inspector of Nuisances," and "Superintendent of Highways;" *is to give his whole time to the Board*, and to receive the munificent salary of 120*l.*, being at the rate of 1¾d. per acre per annum over which he is to exercise his vigilance, and for which he will be permitted to do all the other duties gratis. But, in case it may be thought that this number of broad acres is merely placed under his charge, so as to give him an opportunity of disporting himself over them with his greyhounds, just by way of obtaining healthy recreation, and that his work is confined to the urban part of the district, then his pay will be at the rate of 1s. 6d. per house per annum, and no pay for attending to the 14¾ miles of road, or the other duties which are detailed in the following schedule:—

1. All the duties comprised in the Public Health Act, 1848.
2. Do. in the General Highway Act.
3. Do. in the Nuisances Removal Act, 1855.
4. Do. in the Local Government Act, 1858.
5. Do. in the several Acts incorporated with the foregoing.

It is indispensable that the surveyor must be familiar with,—

6. The construction and working of steam engines.
7. Furnaces for the consumption of smoke.
8. Filters.
9. Works of water-supply.
10. Sewerage by tubular pipes.
11. House drainage.
12. The making and management of roads.
13. Streets.
14. Pavements.
15. Scavengering.
16. The taking of levels.
17. The value of labour and materials.
18. The preparation of plans.
19. Do. of specifications.
20. Do. of estimates.
21. All such works as come within the province of a local board of health.

When the expense of a professional education, and the heavy responsibilities of the office, are considered, can it be expected that the Board, by offering a minimum of salary for a maximum of work, will be likely to obtain the services of an educated and properly qualified gentleman? Certainly not, if the profession have any respect for themselves.

This grinding transaction is the more surprising from the fact that many of the cathedral dignitaries and their functionaries are members of the Board, and they have never rendered themselves notorious by being underpaid themselves for the amount of work they do, or for giving to their superiors "a bond for the due performance of the duties" of their office, although they demand one from their surveyor, "himself in 200*l.* and two sureties of 100*l.* each."

When a man is precluded by the Board from opening an office on his own account, and is thus bound hand and foot, and overworked, who is to decide that he has duly performed the duties of his office?

When I remember the profuse liberality of my monks of old, who believed in and acted up to the Divine injunction, "*Do as you would be done by*," and compare that with the wretched parsimony of their more wealthy descendants, I am in sorrow constrained to ejaculate, "What a falling off is there!"

THE SHADE OF ETHELDREDA.

* This is one of five indignant letters on the same subject.—ED.

PATENTS CONNECTED WITH BUILDING.

RAIN-WATER PIPES FOR BUILDINGS.—*J. Taylor, jun.* Dated 27th March, 1863.—The patentee forms the lowest length of the number of lengths of pipe which together compose a rain-water pipe, and the bottom end of which descends into the trap, of greater diameter than the other pipes, in order that if there be any obstruction in the trap, or in the pipe, this lowest length may be slid upwards over the length of pipe above it, and thus leave a space between the trap and the lower end of the rain-water pipe; so that any matter that had accumulated in the trap can then be readily removed from it, or any obstruction in the pipe can be pushed out at its end. The movable length of pipe is formed with lugs or projections upon it, by which the pipe when raised can be held up, and by which also it is carried when in its lowest position. The rain-water pipes of buildings may also in a similar manner be made with one of the intermediate lengths of the pipe movable, and this is a convenient arrangement when no trap is employed. For this purpose the length of pipe which is to be movable is made of greater diameter than the other pipes, so that it may be slid over the pipe above, but at its lower end it is contracted, so that it may there enter into the socket of the pipe below it. The movable length of pipe is, as in the former case, made with projections upon it, by which the pipe when raised can be retained up.

MANUFACTURE OF TILES.—*W. Clark.* A communication. Dated 23rd April, 1863.—This invention consists, first, of cylinders having circular grooves, and gearing one with the other, for cutting up and crushing the material to be used. Secondly the apparatus is furnished with a pressing box and draw plate, which receives the material from the cylinders and draws it out, so as to form a cake or sheet, which is then hardened by pressure exerted by an eccentric receiving motion from a piston to which it is jointed. Thirdly, the apparatus is furnished with a cast-iron mould for receiving the sheet of clay, in order to form the tiles. This mould is placed in a press acting vertically, in which the sheet of clay receives an energetic pressure, which reduces it one-third of its thickness, and so causes it to take the exact form of the cast-iron mould. Tiles manufactured in this way are then trimmed round, and exposed for a few days only to the air, in order to partially dry them, after which they are placed in ovens to be baked, as in ordinary cases.

Books Received.

The New Path. 1 *to* 6. 97 East Twenty-ninth-street, New York, U.S.

THIS is a monthly publication, 8vo. in size, avowedly to spread the principles of the so-called pre-Raffaellite School in America. It proceeds from an "Association for the Advancement of Truth in Art." The views of the founders may be learnt from this paragraph in the Introductory article:—

"The new path into which the best minds of the present day summon the young to enter, is the earnest loving study of God's work of nature. This is not only taught to the artist, but to the writer, the poet, and the teacher. It is the moving spirit of the age in which we live; an age greater in all essentials than any that has preceded it, second to none in the purity and strength of its religious ideas; to its love of man, which is the best fruit of its love of God, in its tolerance, its enthusiasm, its energy, and in the wide-spread diffusion of wealth and education, which are saving it from selfishness and dilettanteeism.

A few individuals persuaded of these things have joined themselves in a society, for mutual strength, and for the better dissemination of these ideas. They propose to print, from month to month, a journal, in which they can communicate with others who think with them, or may be led to do so."

The writing at present is for the most part a reflection of much that has been said in England.

VARIORUM.

The Christmas number of *All the Year Round*, conducted by one to whom we all owe a great debt for healthful delight, one who has given us more ideal friends to love than any other living writer, the perennially genial Charles Dickens, does not need mention by us, the large majority of English readers looking for it as a matter of course, and intending to buy it, quite sure of getting much more than value for the 4d. expended on it. Last year, if we remember rightly, the sale reached 200,000 copies. We shall not be astonished if it touch a quarter of a million this. Suffice it for us to say that it is called "Mrs. Lirriper's Lodgings" (as if any one did not know it?), and that besides the hearty proprietor who, in the shape of "me and the major," keeps house characteristically, every floor in that No. 81, Norfolk-street, Strand, is occupied by a good hand, who does his best to make the "Lodgings" agreeable. We see with pleasure, and go out of our way to mention it, that Mr. Dickens is about to issue a new serial story in parts, uniform with the original edition of the immortal "Pickwick."——Messrs. De la Rue & Co. have published their elegant little calendars and pocket-books, with indelible diary, the latter of all sizes in leather and satin; dainty books for the daintiest lady. They are edited by Mr. Glaisher, and contain a photograph of the moon, with a notice of our Satellite, by Mr. Hind.——*Fraser's Magazine* has a well-timed article under the heading "Plays, Players, and Critics," directed against the preposterous praise mistakenly given lately to some idols of the hour, and calling at the close, as we have before now desired, for the foundation of a theatre where the histrionic art might be maintained at its highest level aloof from sordid aims. The writer suggests that this would be the best monument to mark the tercentenary of Shaks-

peare's birth.——The *Ecclesiologist* has an illustrated notice of the Dutch church, Austin Friars. ——The bound volume III. of "The Children's Friend" (Seeley), gives for 1s. 6d. a large number of admirable illustrations, with moral and religious stories, maxims, and anecdotes. It must need an immense circulation to pay the cost. The Hieroglyphical Readings are a good notion; well calculated to exercise the powers of children. ——*The Band of Hope Review* (Partridge) has also the advantage of very excellent illustrations. The part for the year, with a coloured cover, includes a capital likeness of George Cruikshank, to whom it is dedicated.——*Young England* (Tweedie), maintains its course, and justifies the good things that have been said of it in many quarters.——The "Publishers' Circular," for the current month, contains with its usual lists, a large number of engravings from illustrated works of the season.——Under the title, "The City Diary and Almanac for 1864," a new diary and year-book, specially adapted to the citizens of London, has made its appearance. It comprises the names and addresses of all the members of the corporation, the City offices, courts of law, unions, halls or offices of the civic companies, with the clubs, presidents and officers of the royal hospitals, ward clerks and beadles, a calendar of local and general events, and a mass of other matter, in a convenient form for reference. The space given for each day is scarcely enough. The Diary is in a stout cover, and interleaved with blotting-paper.—— The Christmas number of "London Society" (a second number in the month) is singularly rich in illustrations, and has some very good stories. Its cheapness is marvellous.

Miscellanea.

Petroleum.—American rock-oil is now exported to almost every quarter of the globe. From the 1st of January until the close of October, 1862, there were 5,195,481 gallons shipped from New York alone. For the same period this year, New York has exported 15,503,166 gallons; Philadelphia, 4,268,244 gallons; Boston, 1,604,846 gallons; Baltimore, 806,961 gallons. In round numbers, the total value of the exports from the ports above-named, from January 1 until the close of October, will not fall short of 10,000,000 dollars.

Shakspeare's Celebration.—At the general meeting of the National Shakspeare Committee, held on Monday last, it was announced that the Archbishop of Canterbury, the Archbishop of Dublin, the Duke of Devonshire, Lord Brougham, and the Lord Chief Baron of the Exchequer, had accepted office as vice-presidents of the Association. A site committee was appointed, "to consider the principles which should govern the selection of a site for a Shakspeare memorial, to inquire into the number of appropriate sites, and ascertain which of them may be obtained, and on what conditions, for the purpose of erecting a public monument of a large and noble character."

Bois de Boulogne Hotel.—The directors of the Bois de Boulogne Hotel and Land Company have appointed as their architect Mr. John Giles, of Verulam-buildings, Gray's Inn. The intention of the company, as we have before noticed, is to erect two new boulevards and a hotel, which is to be the "Star and Garter" of Paris; upon land overlooking the Seine at an easy drive from Paris through the Bois de Boulogne. The amount of land ceded to the company is upwards of 130 acres, part to be laid out and let to private persons and speculators, and part to be covered by the new boulevards and hotel. The situation is one of the most beautiful near Paris, and the land is said to be moderate in price.

The Wire-fence Trap for Fox and Hare Hunters.—Farmers have discovered that wire-fencing is a cheaper and more effectual fencing for fields than post and rail fencing, and are fast covering the country with what the hunting gentry regard as little better than men and horse traps; because they cannot clear what they can scarcely see, we presume, and are hence effectually hindered from encroaching on the farmers' fields. Threats of coercion have been uttered by some who fear that an end is about to be put to hunting in the field; but others have pointed out that such threats are of no force, and advise a friendly understanding with the farmers and the temporary removal of the fences after the crops are off the ground, or from November to April, the removal and replacement to be at the cost of the sportsmen.

A Big Stick of Timber.—Some time ago a splendid stick of white oak timber was landed at the Globe Works, Boston. It was one of the largest ever brought into Boston. It measured 66 feet in length, and was hewn up square, on the average, 28 inches by 29 inches. It contained 370 cubic feet. Its actual weight would not be less than 12 tons. It was brought from the State of New York.

The Corporate Income of Liverpool.—The net income of the corporation of Liverpool for the year has been 124,528*l.*, and the expenditure classified as obligatory amounted to 91,471*l.*, leaving a surplus, in round numbers, of 33,056*l.* The following payments have been made out of the surplus for the year ending August, 1863:—General improvements, 13,689*l.*; Botanic Gardens, 1,500*l.*; public schools, 2,500*l.*; park, 500*l.*; new baths, Everton, 425*l.*; in aid of the lighting rate, 13,700*l.*; in aid of the fire-police rate, 1,531*l.*

Hebrew Monuments and the Jews.—Certain discussions at the Institute relative to the age of Hebrew monuments, have suggested a new exploration of Jerusalem and other cities in Palestine. M. de Sauley, Abbé Michon, and Mr. Saltzmann start this month on this interesting expedition. The 20,000 francs prize decreed by the Emperor for the most important discovery in science, was adjudged this year by the Institute to M. Oppert, a Jew, for his persevering labours and success in decyphering the cuneiform inscriptions. The coincidence is striking, that a Jew should be the unfolder of Babylonian and Assyrian documents. *Letter from Paris.*

The New Act on Savings' Banks.—On Saturday week, the new Act on Savings' Banks, passed in the late session, came into operation. The law is now amended and consolidated into one statute. The new Act is not to affect Post-office Savings' Banks. The interest to be paid by the Government to the trustees is to be 3*l.* 5s. per cent. per annum, and the interest to depositors is not to exceed 3*l.* 0s. 10d. per cent. Infants and married women can make deposits, and should the husbands of the latter give notice, the money is to be paid to them. All depositors are restricted to one savings' bank, on pain of forfeiture. The interest to be calculated half-yearly, on the 20th November and the 20th May, and to be added to the principal. No new bank is to be formed without the approval of the National Debt Commissioners. The rules are to be certified by the barrister appointed. In the event of death or bankruptcy of any officer holding money, the trustees are to be the first paid out of the estate.

Restoration of St. Mary Redcliff Church, Bristol.—The committee of the Canynge Society, in a report they have just issued, state that, "in consequence of the severe domestic affliction under which the president, S. W. Lucas, esq., had been suffering, it was found impossible to make the necessary arrangements for holding the general meeting during the last summer; and as Mr. Lucas kindly consented to continue president until after the next anniversary, it has been determined to postpone the meeting until 1864, when it is hoped, as a slight acknowledgment of Mr. Lucas's munificent donation towards the restoration fund, that all those who are interested in this work will support him by their presence. The committee are happy to announce that since their last report the restoration of the church has steadily progressed. The north side of the lady-chapel, the whole of the flying buttresses of the clerestory, six of the side windows, the large north window, and the exterior end of the north transept, are completed. The ceiling of the north transept has been cleaned and restored: the columns of the chancel have been restored; also one bay of the screen on the north side. The parapet of the tower, which was in an unsafe state, has been repaired. The north-west clerestory is now in progress. The flying buttresses are completed, with the jambs and arches, and the panel work above is in course of restoration. The east window of the north chancel aisle, intended as the Handel commemoration window, is now in hand by Messrs. Clayton & Bell. All the old pews have been removed, and the paving made good, ready to receive the new seats. A new Pennant stone staircase to the organ gallery has been erected. Seeing the magnitude and importance of the work in which the restoration committee are engaged, it behoves the Society to continue its efforts in providing the necessary funds." The subscriptions for 1862 amounted to 152*l.* 16s., and the donations during the same period to 65*l.* 9s. 10d., which includes a collection of 39*l.* 2s. 10d., at St. Mary Redcliff, after a sermon by the bishop.

Steam Cultivation in Egypt.—A considerable number of steam-ploughs and other implements have been sent to Egypt, with a view of preparing the land for the growth of cotton.

Proposed Hotel for Eastbourne.—A new hotel, with baths, is shortly to be erected at Eastbourne, the drawings and particulars being now far advanced. The site selected is on rising ground westward of the Grand Parade, the soil being the green sandstone rock. The frontage towards the sea is 230 feet, and that towards the roads, right and left, which flank it, 110 feet. The new part of Eastbourne where this hotel is to be erected has a series of terraces opposite the sea, rising one above the other, and which make upon the stranger a strong impression. The estimated cost of the building is 30,000*l.*, and the architect is Mr. Knightley, of London.

Townhalls.—The erection of a townhall for Edinburgh is mooted in the *Scotsman*. Mr. Rhind, the architect, proposes to acquire from the Bank of Scotland the ground which belongs to them to the east of their head-office, and to construct there a terrace to run parallel with North Bank-street, diverging to the south in a new street which he proposes to form immediately opposite St. Giles's Church. To the south of the new terrace Mr. Rhind proposes to erect the town-hall, with its front facing Prince's-street, and the architecture is to be of such a nature as will be in keeping with its surroundings. Other portions of the suggestion provide sites for Trinity College Church, the Albert Memorial, &c.——The Treasury, it is understood, will give 3,000*l.* towards a town-hall, at Merthyr, in Glamorganshire, Wales, for the accommodation of the County Court Judge, offices, &c. A Government official has inspected the proposed site, opposite the Castle Hotel, and gives a favourable report.

Ventilating Mines.—To ventilate mines by means of steam and heated air, without the use of open fires and furnaces, has been provisionally specified by Messrs. Evans, of Cefn Mawr, and Griffiths, of Merthyr Tydvil. They propose to erect, contiguous to the upper part of the upcast shaft, a tower or structure open at the top (except as hereafter stated), and they lead from the lower part of this hot-air tubes in communication with a fire-clay pipe, formed at one or each side of this furnace in the form of a channel, the air in the pipe being thus heated in the furnace, and supplying the interior of the tower in the lower part; and they prefer to carry a steam-pipe from the top of the said steam-boiler into an upper point of the interior of the said tower, at the end of which steam-pipe they provide a steam-box, with a ring of jet-pipes projecting upwards, and at the top of the tower there is an inverted cone, for regulating the draught. The bottom of the tower is made inclining to the centre, so as to form a drain, to carry off any condensed water. Instead of placing the furnace and boiler outside the tower, or structure aforesaid, they can have it, or portions of it, placed within the tower.

The Tees Breakwater.—The foundation stone of a new breakwater, at Stockton-on-Tees, has been laid by the chairman of the Tees Conservancy Commission. The plans are for the construction of two curvilinear breakwaters; one line extending from Tod Point, on the southern shore, across the Bran Sand, to the Checkered Buoy, a distance of about 4,300 yards. From the site of the First Black Buoy the line of works will extend over the North Gare—a distance of 2,000 yards, terminating at the Seaton Snook. The entrance to the channel between the ends of the breakwaters will be about 600 yards in width. The total length of the breakwater will be about 6,600 yards, the average height about 15 feet, and the width at the top 40 feet. The breakwater was commenced at the beginning of the present year, and already considerable progress has been made. It is constructed in rubble, the material used being, as we have before noticed, the slag from the iron furnaces in the district. The slag is moulded into large square blocks, weighing about 3 tons each, and whilst they are in a red-hot state are conveyed to the breakwater and "tipped." The mode of constructing the breakwater is similar to that adopted with the Plymouth and Cherbourg breakwaters. In the conveyance of the slag from the furnaces two locomotives and 500 iron bogies are fully engaged. The amount required to carry out the scheme is estimated at 100,000*l.*, of which 30,000*l.* have been obtained from the Public Works Loan Commissioners. If constructed in stone it was estimated that the building would have cost 600,000*l.* A grand banquet took place in the afternoon at the conclusion of the ceremony of laying the stone.

THE LATE MR. J. D. HARDING.—We hear with great regret of the death of this distinguished artist, in the sixty-seventh year of his age. It took place at his residence, in Barnes, Surrey, on the 4th inst. Mr. Harding was a pupil of Prout, and was one of the first to employ lithography for the multiplication of his studies of landscape for the use of others. Several of his published works are extensively used as text-books for pupils. All frequenters of the Royal Academy and the Gallery of the Society of Painters in Water-colours know his sparkling pictures.

MANUFACTURE OF CAST-IRON.—An invention which consists essentially in mixing with melted pig or cast iron, which it is intended to form into castings, a quantity of melted steel, semi-steel, or malleable iron, which said metal has been obtained from refining or decarbonising melted pig or cast iron by the pneumatic process, in order by this admixture to strengthen and improve the quality of the said pig or cast iron, has been patented by Mr. Robert Mushet, of Coleford. He does not claim the addition of malleable iron in the solid state, made by the puddling process, to pig or cast iron, and the melting of these substances together in order to improve the quality of the pig or cast iron, as he is aware that this has already formed the subject of a patent claim.

EMIGRATION TO THE "BRITAIN OF THE SOUTH." The ninth edition of "The New Zealand Hand-book or Guide," by Messrs. Willis, Gann, & Co., of the New Zealand offices, in Crosby-square, has been published by Stanford, of Charing-cross. Although issued under the auspices of agents interested in emigration to New Zealand, this is a well-written and useful compendium of information as to a now favourite colony, which only needs a right and quiet understanding with the natives to render it all that can be desired. The unsettled state of the colony, however, is restricted to a district of the north island, and does not affect the south, which includes the more English district of Canterbury and the more Scottish district of Otago. The little Guide under notice has a map of New Zealand, and one of the world on Mercator's Projection showing the different routes to and from New Zealand and Australia.

CONTRAST OF COLOURS.—A short time ago, M. Plateau sent in a paper to the Academy of Sciences, in which he concluded that M. Chevreul's law of the simultaneous contrast of colours was not applicable to one particular case, viz., that when, from a certain distance, a very narrow streak of colour is viewed on a ground of another colour, it seems to combine with the colour of the ground, instead of appearing modified by the complementary colour of the ground, as it ought to do by the law of contrast. This law, as stated by M. Chevreul, is as follows:—1. The mixture of two simple colours gives a pure binary colour, viz.,—orange, by red and yellow; green, by blue and yellow; and violet, by blue and red. 2. Three simple colours, or two colours which are complementary of each other, give either black or a normal grey, composed of either red or green, yellow and violet, or blue and orange. 3. If the proportion of the three colours, or of two complementary ones mixed together, do not give black or a normal grey, because of the predominance of one of the colours, then the result of the mixture is either black or grey, with a dash of the dominant colour in it. Now, if two zones of different colours and the same dimensions be placed in juxtaposition, and two other zones of the same colours respectively be placed separately, and at some distance from each of the former, in order to judge of the effect, it will be found that a simple colour can only be modified by the addition of one of the two other simple colours, and that a binary colour can only be modified by one of the two simple colours of which it is composed. Again, as to simultaneous contrast, when two zones, placed side by side, and differing both in tone and colour, are seen simultaneously, the lightest loses a part of its colour, and the darkest increases in intensity, while the colour of each assumes a shade of the complementary colour of its neighbour. Hence the principle of contrast is diametrically opposed to that of mixture, and M. Chevreul explains M. Plateau's phenomenon by saying "that, when the eyes of the spectator distinctly see the forms and colours of the model reproduced, at a distance where the finite extent of each element of colour ceases to be perceptible, then the effects of vision no longer belong to the principle of contrast, but to that of the mixture of colours. So that, in M. Plateau's narrow streak, its colour is mixed with that of the ground, when the distance is such that the outlines of the streak are no longer perceptible.—*Galignani*.

THE "CITY (OF LONDON) ARCHITECT."—We are told that the Corporation are more than disposed not to fill up the post rendered vacant by the lamented death of Mr. Bunning,—to have no *architect*, in fact, but to appoint a *surveyor* at 1,200*l*. a year, with four assistants, at fair salaries, and to send to competition all works for which they require designs. Should they take this step they may prepare to be always in hot water. It is to be hoped they will be better advised.

QUANTITY OF TURPENTINE NECESSARY TO DRY GAS TAR.—"A Friend," Limerick—1. How much turpentine to the gallon of gas tar should be put as a drier? and can I use anything to change its colour to brown or yellow, and what, and how much?——About a pint of spirits of turpentine to the gallon of tar: if required to dry very quickly, you may add more. Yellow ochre may be added in quantity at pleasure, to change the black to the several shades of brown; but to render the colour yellow is impossible.

TURKISH BATHS.—The half-yearly meeting of the shareholders of the London and Provincial Turkish Bath Company has been held, at the premises of the company, named the Hammàm, 76, Jermyn-street, when a dividend, at the rate of 6 per cent. per annum, was declared. In the course of the meeting, Mr. Crawshay asked why the dividend declared was not 8 rather than 6 per cent., seeing that the profit earned seemed to fairly warrant the larger rate. The chairman explained that, being a young company, it was thought better to keep an available balance in hand to meet any contingencies. The chairman also stated that, satisfactory as the present state of the company's affairs now is, it would become much more so if additional capital of about 8,000*l*. were subscribed, to enable the directors to carry out what was contemplated, for developing and increasing the resources of the establishment.

THE ROYAL EXCHANGE CLOCK.—The colossal proportions of some of the clocks in our chief churches and cathedrals would surprise most persons who have not made a personal examination of them: for instance, as regards the Royal Exchange clock, which was manufactured by the late Mr. Dent in 1843, and which has since been pronounced by the Astronomer Royal to be the best public clock in the world; the pendulum, which weighs nearly 4 cwt., is compensated, and the first stroke of the hour is true to a second. This clock has Mr. Airey's construction of the going-fuzee introduced, by which the winding is effected without stopping the motion. This clock is a great improvement on that placed in this building in Sir Thomas Gresham's days, respecting which it was reported, in 1624, that, "the Exchange clocke was pr'sented for not being kept well, it standing in one of the most eminent places in the Cittie, and being the worst kept of any clocke in that Cittie." This clock still bears a very high character, and it is worth while to remark that Mr. Dent, who became so famous a horologist, was originally employed as a candle-maker. John Scott, the well-known engraver of sporting subjects, was also employed in the first instance in the same business.

PNEUMATIC DESPATCH TUBES.—It is now proposed to lay a tube from the Euston Station, through Woburn-place, Southampton-row, and King-street to Holborn, and thence along Holborn, Skinner-street, and Newgate-street, to the General Post-office. This tube is to be of cast-iron, 4 feet high and 4 feet 6 inches wide, internally. When completed, the transmission of all letters in bulk between the General Post-office and the North-Western Railway will be effected by its agency, as will also large parcels of goods, for which Pickford & Co. have arranged, an extension to their depôt in Gresham-street being contemplated. Mr. Haywood, the engineer to the City Sewers Commission, has presented a report to his Board on the subject. He states that, assuming the pneumatic system to work satisfactorily, it will probably become a valuable auxiliary to the commerce of the city, and be the means of freeing the streets of much goods traffic. But, he says, the laying of the proposed tube through the crowded streets will cause the greatest public inconvenience, for its size will be that of a large sewer, and its depth must be greater than that of the street sewers, inasmuch as it cannot be allowed to interfere with the house drains. Besides, the present occupation of the surface by gas, water, and telegraph pipes will, he apprehends, preclude the possibility of the tube being laid at a less depth. The inconvenience will be the most felt in Newgate-street, for while the work is in progress the traffic there could hardly be allowed to pass in both directions.

LIVERPOOL ARCHITECTURAL SOCIETY.—The fortnightly meeting of this Society took place on Wednesday night, the 2nd inst., Mr. Weightman presiding. The secretary read a communication from Mr. Vaillant, acting secretary to the fund for the erection of a memorial monument to the late Mr. James Murray, requesting this Society to assist in the object by subscriptions. Mr. Audsley read a paper on "Christian Symbolism as applied to Art;" and at the close of his remarks, which were illustrated by designs, some discussion took place respecting the subject of which the paper treated.

WORKING MEN'S CLUBS FOR BETHNAL-GREEN. A meeting has been held in the Town-hall, Bethnal-green, for the purpose of establishing a club for working men in the district of St. Matthias. Sir Thomas Fowell Buxton presided. The Chairman, in opening the proceedings, referred to the self-supporting principle of these clubs, and said he trusted that the club for St. Matthias would prove a blessing to the working people of the neighbourhood. Mr. Solly, the secretary to the Working Men's Club and Institute Union, mentioned that the firm of Truman, Hanbury, & Co., had sent 20*l*. to the club in Peel-grove, Bethnal-green, preliminary help in the way of funds being generally needed in the formation of the clubs. A provisional committee was formed.

CLARK'S SAFETY RAILWAY BRAKE.—An experimental trial of this brake has been made on the North British Railway, and the following is the result as given by the *Edinburgh Courant*. The train consisted of five loaded carriages. The engine was one of the high-speed mail class, with 6-feet driving wheels. The first stoppage was made on the gradient near St. Margaret's, of 1 in 75. With a speed of above 40 miles per hour, the train was stopped in about 300 yards: and on the level, at a speed of 30 miles per hour, the train was stopped in about 100 yards. Other trials were made equally good. The brake is applied by one man on the tender instantaneously, by simply screwing friction-wheels against the running-wheels of the tender. The brakes, which are fitted to the carriages, are compressed uniformly, so that no concussion is felt in these short ranges, which are about an eighth part of the distance a train can be stopped in by the present brake power.

ACCIDENTS.—By the fall of a floor at Leeds several girls have been injured. Repairs were in progress in the attic, and bricks, &c., had been heaped up to such an extent that the floor gave way. In the room below, which extends the length of the premises, about forty young women were engaged at sewing-machines, when, without the slightest warning, a third of the floor above them, as well as a large quantity of bricks, fell in, completely burying the five girls who were working in that portion of the room. In about half an hour they were taken out and removed to the infirmary. All of them were bruised and injured severely, and one of them was in a dying state. She was literally doubled up.——The roof of the engine shed at the Railway-station, Hawick, fell last week while the men were cleaning the engines: four men were more or less hurt. The roof was of iron, and fell without giving the least warning: it was about 100 feet long, 30 feet broad, and 30 feet from the ground. It is understood that the iron had been corroded by the steam. It is only about thirteen years since it was erected.

AN IRISH STEAM FISHERY.—We have occasionally drawn attention to the deep sea and other fisheries off the coast of Ireland as an inexhaustible and convenient source of fish supply, by railway and otherwise, to the whole country; but hitherto no one seems to have made any great practical use of these rich and profitable fish-diggings. As for the Irish themselves, as we have before said, they seem to agree in opinion with their countryman who thought it would be a pity to "take all the fish out of the sae." A canny Scot, however, it appears, has fairly broken ground on the Irish coast, with a well-appointed steamer, named the *Sir William Wallace*, which he has supplied with all the requisite apparatus for fishing, including a donkey engine, for paying in and out the nets, which are of large size and novel construction. The owner is a Mr. Wallace, who has already been for some time in the north of Ireland engaged in fishing speculations, so that he knows what he is about, and has gone to work in earnest, while the Irish are still merely looking on. The *Sir William Wallace*, until the salmon season opens, will be employed in the deep-sea fisheries, either along the Kerry and Clare coasts, or in the estuary of the Shannon.

IMPROVEMENTS.—The area situate at the corner of Carey-street, Lincoln's-inn, and Chancery-lane, which has for so long a period been left vacant, has been purchased by the Union Bank of London Company, and it is designed to erect thereon a branch establishment of the bank for the locality, and also a range of chambers.

THE NEW FINSBURY PARK.—At the last week's meeting of the Metropolitan Board, a loan of 50,000*l.* was agreed to for the purchase of the land to form the northern park under the borough name. The price to be paid for the land has been settled by arbitration, and the cost per acre is considerably under 400*l.*; so that the park, which is to be of about 120 acres, will cost less than 50,000*l.*

THE LEICESTERSHIRE ARCHITECTURAL AND ARCHÆOLOGICAL SOCIETY.—The usual bi-monthly meeting of this society has been held in the Guild-hall, Leicester, the Rev. J. H. Hill in the chair. Letters were read from Earl Howe and other gentlemen expressive of their desire to further the wishes and interests of the society at its intended meeting at Hinckley next year. Various antiquities were exhibited and other business transacted. Messrs. Goddard & Son, architects, produced the plans and working drawings of the schools to be shortly erected in St. Martin's, Leicester, by the trustees of Alderman Newton's Charity.

FIRE-PROOF CONSTRUCTION. — A patent has been obtained by Mr. Thomas Turner, of Glasgow, for what is called "Improved fire-proof construction for floors, ceilings, roofs, bridges, ships, and other purposes." This construction is, like other fire-proof floors, composed principally of iron and concrete; but the object of the improvement is the more perfect combination of materials, so as to form one united thoroughly bonded mass, and the omission altogether, where necessary, of timber to sustain the concrete, and the straps and laths which are employed as a preparation for plaster ceilings. To effect this, iron joists of open construction are used, and the concrete is arranged to go under as well as over and through the joists.

THE GALWAY HARBOUR IMPROVEMENTS.—Some difficulties having come in the way of the larger scheme which required a loan of 75,000*l.* from Government, the plans have been materially modified, and submitted for the consideration of the board. In a report from Mr. Roberts, C.E., that gentleman proposes to connect Mutton Island with the mainland by means of a causeway formed by a timber superstructure at a level above the influence of the sea, supported by five massive main piers of masonry, with intermediate piers formed of iron piles. By this arrangement, he says, the connexion between the land and the island may be secured at a cost of considerably less than one-half that of a stone structure. From Mutton Island he proposes that a breakwater should be extended for a length of 750 feet, and that on its inside, for a length of 400 feet, a timber landing wharf should be constructed, forming a berth for one vessel to discharge or load her cargo. The report was adopted, and it was also ordered that the plans be forwarded to the Board of Trade.

OPENING OF NEW LECTURE HALL AT SUDBURY. When extensive premises, situate between the Corn Exchange and the Literary Institute, on the Market-hill, were sold last year, it was suggested that part of them might become the site of a public hall, and they were purchased with that view by Mr. J. Alexander. It was at first intended to build the hall by a company, and some shares were taken; but it was found there were difficulties in the way, and Mr. Alexander, in co-operation, we believe, with Mr. W. D. King (both members of the Society of Friends), determined to take the responsibility on themselves. The original shop and dwelling-house were converted into two rooms, a wide passage-way being left between the tenements as an approach to the hall, which was afterwards built in the rear. The dimensions of the hall (inside measurement) are 66 feet 6 inches by 33 feet 6 inches; height 21 feet 4 inches, and it will seat about 500 persons. The hall is lighted by lofty windows at the sides, and ventilation is provided for. It will be heated by stoves placed in the cellars below, and lighted by gas-brackets on the walls and pendant chandeliers, supplied by Mr. S. Wright. The hall is built of red and white brick. The contractor was Mr. J. Holland, builder, Sudbury. The building has been opened with a *conversazione* and exhibition of works of art, lent from the South Kensington Museum, the Art Union of London, and private owners.

NEW PUBLIC PARK FOR OLDHAM.—The first sod of the Public Park has been cut by the mayor. The object the council has in view in forming a public park is two-fold,—to find work for the unemployed operatives and to provide a park for the people.

OPENING OF THE NEW CATTLE MARKET, DUBLIN.—The Dublin Metropolitan Cattle Market has been formally opened by the Lord Mayor. The market stands on 12 acres of ground, and is approached by entrances in Prussia-street and on the Circular-road. There are 134 iron pens erected, and the ground occupied by them is intersected by broad paved walks. Iron tanks for supplying water are placed at convenient distances from the pens. The hotel, which faces Prussia-street, leads into the market.

SALE OF BUILDING LAND, BRIGHTON. — The Queen's Park, Brighton, has been sold. The auctioneer said he estimated the 30 acres of park land as being worth 30,000*l.*; the late Mr. Attree's villa was worth 6,000*l.*; and the property occupied by Mr. Freshfield, 4,000*l.* The Spa he put at 500*l.*, calculating on twenty-five years' purchase. Therefore, he thought he was within the mark when he said that the property was fairly worth 40,000*l.* It was ultimately sold for 28,000*l.* to Mr. Duddell, Parliament-street, London, who, it is understood, intends it for building purposes.

ORIGINAL DESIGNS, SOUTH KENSINGTON.—Among the recent purchases made by the South Kensington Museum for the Art-Library, is a collection of about 250 original designs by Matthias Lock and Chippendale, part of which were exhibited in the late International Exhibition. Chippendale and Matthias Lock were designers and carvers in wood, who flourished during the last century, from 1740 to 1780. They published works on furniture and designs for other manufacturers, and were noted as well for their taste in design as for their execution.

GAS.—About twelve months ago, Messrs. Nordhoff & Co., of Nismes, patented a gas carburetting apparatus, which soon came into use in several large towns in the south of France. The apparatus has just been patented in England. One has been exhibited at Messrs. Hartwright & Meyerheim's, 19, Chapel-walks, Pall-mall. The apparatus is intended to be placed near the gasmeter, and its adoption, it is said, will not require the least alteration in the gas-fittings. In outward appearance, the apparatus is described as resembling a meter. The internal arrangements consist simply of a cubic network of worsted wicks, reaching with its ends into some carburetted liquid, which is of a constant level. This network is placed in a cylinder of copper or iron, between two sides pierced with small holes. A tube, also perforated, leads the gas through the network of wicks. The instrument varies in size from five lights up to 150 lights.——The following tenders for the erection of the new gasworks at Bedford have been sent in:—

Houghton & Day	£2,950	0	0
Maxey.....	2,820	19	6
Cunvin	2,745	0	0
Francis & Son	2,299	10	0
Conquest (accepted)	2,190	0	0

THE NEW COVERED MARKET AT DERBY.—The erection of this market is progressing. The general arrangements on the ground plan show a market hall, measuring externally 223 feet in length by 115 feet in width, and internally 220 feet by 110 feet 6 inches, extending from a point 26 feet south of the back wall of the townhall to the new gateway erected at the end of the new street branching out of Albert-street, opposite Princes-street, which it is proposed to call "Exchange-street;" with a smaller building adjoining for the sale of fish and game, measuring inside 60 feet in length by 38 feet wide, abutting upon the main building at the south-east corner, with a small triangular piece of land reserved for a soup kitchen, occupying for the most part the site of the old lock-up. An approach, about 27 feet in width, will lead from the east end of Albert-street and the Morledge to the south-east entrance of the fish market. The builder's work has been let to Mr. C. Humphreys, for 5,750*l.*; and the ironwork to Mr. J. Haywood, jun., for 4,802*l.*; total, 10,552*l.* The style of architecture adopted is Italian, chiefly executed in brickwork, relieved round the sides and ends by stone string courses, imposts and dressings at the doorways and entrances. The N.N.E. elevation will be in the rear of the townhall. At the opposite end the market will be seen from Albert-street: here the elevation differs, the centre of the façade being wholly of stone-work, terminating with a large pediment, in the tympanum of which there will be carved the Borough Arms.

OXFORD ARCHITECTURAL SOCIETY.—A meeting of the Oxford Architectural and Historical Society was held in the Taylor Building on Wednesday, the 2nd instant. Subjects:—1. On the Building of the Trinity Aisle, Thame, A.D. 1442, by Mr. E. J. Payne; 2. On some Churches in France, by the Rev. P. G. Medd, M.A., University College.

FATAL ACCIDENT TO A "STEEPLE JACK."—A man was suspended 75 feet in the air by a rope thrown over the top of a chimney at Messrs. Kendall Ghent's machine works, Salford. This was to enable him to point some of the masonry or brickwork. The rope broke, and of course the man was killed by the fall.

JOHN BUNYAN'S BONES.—A public meeting of some hundreds of working men has been held in the Lambeth Baths, Westminster-road, on the rumoured attempt of the Ecclesiastical Commissioners to appropriate Bunhill-fields burial-ground to building purposes. Mr. G. Hill, of the Lambeth vestry, presided, and introduced the business of the meeting by calling upon Mr. G. M. Murphy to deliver a lecture upon the subject. The lecturer traced the history of Bunhill-fields, from the time it became a bone-hill, by the burial there of many who died of the plague in 1665; soon after which it became a Nonconformist burial-ground; and among the buried, as we have before pointed out in the *Builder*, there lie John Owen, George Fox, John Bunyan, Daniel De Foe, Isaac Watts, John Wesley's mother, Dr. Lardner, and many martyrs of political and ecclesiastical tyranny. Mr. Murphy concluded by proposing the following resolution, which was unanimously carried:—"That this meeting, having learned with surprise that it is in contemplation by the Ecclesiastical Commissioners to remove the remains of the honoured dead from Bunhill-fields, and to let the land for building purposes, cannot but express its utmost indignation at such a sacrilegious project, especially as in that renowned place are the mortal remains of the immortal author of the 'Pilgrim's Progress.'"

OPENING OF A WORKPEOPLE'S HALL, AT SMETHWICK.—Messrs. Fox & Henderson having given up their well-known works at Smethwick, in 1858, they came into the hands of Messrs. Watkins & Keen, patent nut and bolt makers, who employ about 1,000 men, women, and boys. Having a spare piece of land at one corner of their works, fronting Crawford-street, they employed Mr. J. B. Nicholls, of Smethwich, architect, to furnish plans, and in a short time they had erected a building containing a hall, 90 feet long by 60 feet wide, with a spacious gallery, and which is capable of seating nearly 2,000 persons. At one end of the hall is an orchestra; and there are comfortable seats and desks of stained deal running across the room. One part of the room is partitioned off for a library, and Messrs. Watkins & Keen have already purchased upwards of 2,500 volumes to furnish it. There are large boilers erected in the room for the purpose of making soup and coffee for the workpeople at dinner and tea time. Adjoining the hall is also a good-sized room, which will be fitted up for baths. The building and fixtures have cost upwards of 1,000*l.*, which has of course been defrayed by Messrs. Watkins & Keen, who give the hall, which has just been inaugurated, for the use of their workpeople. If there be any truth in the mobility's axiom, "Handsome is as handsome does," Messrs. Watkins & Keen must be handsome fellows, *et error nullus*.

THE OLD LONDON FIRE BRIGADE.—The following note of the means used, in the early part of the reign of Richard I., for the purpose of preventing the loss of life and the destruction of property by fire, is interesting; and although we have in the metropolis much to do in this respect in our own times, the contrast between the old and the new is striking. In the first year of Richard I., the articles of the Wardmotes respecting fires are as follows:—"Item, that all persons who dwell in great houses within the ward have a ladder or two ready and prepared to succour their neighbours in case misadventure should occur from fire. Item, that all persons who occupy such houses, have in summer time, and especially between the Feast of Pentecost and the feast of St. Bartholomew (August 24th), before their doors a barrel full of water for quenching such fire, if it be not a house which has a fountain of its own. Item, that the reputable men of the ward, with the aldermen, provide a strong crook of iron, with a wooden handle, together with two chains and two strong cords, and that the bedel have a good horn and loudly sounding. Of persons wandering by night, it is forbidden that any person shall be so dareing as to be found wandering about the streets of the City after the curfew rung out at St. Martin's-le-Grand and St. Laurance, or at Berkyngchirch, upon pain of being arrested."